



"Jolly, Samuel K SAW"  
<Samuel.K.Jolly@usace.army.mil>

06/04/2009 10:49 AM

To Stan Meiburg/R4/USEPA/US@EPA  
cc Rebecca Fox/R4/USEPA/US@EPA, Jim  
Giattina/R4/USEPA/US@EPA, Tom  
Welborn/R4/USEPA/US@EPA, Palmer  
bcc

Subject PCS ROD

<<PCS ROD.pdf>>  
Mr. Meiburg,

Attached find a copy of the signed, proffered permit and ROD for PCS Phosphate. PCS has requested we remove condition "EE" which states no work authorized by the permit may begin until 10 days after the ROD is provided to EPA. We will not remove that condition unless you provide written concurrence with such an action.

Ken Jolly  
Chief, Regulatory Division  
Wilmington District  
910-251-4630

**DEPARTMENT OF THE ARMY PERMIT**

Permittee **POTASH CORPORATION OF SASKATCHEWAN PHOSPHATE  
DIVISION, AURORA MINE**

Permit No. **200110096**

Issuing Office **CESAW-RG-L**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: **discharge fill material into 3,927 acres of Section 404 jurisdictional waters of the U.S.**

Project Location: **adjacent to the Pamlico River and several of its tributaries located north of the town of Aurora, Beaufort County, North Carolina**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2045**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

## **SEE ATTACHED SPECIAL CONDITIONS**

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
  - Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
  - Section 404 of the Clean Water Act (33 U.S.C. 1344).
  - Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
  - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
  - b. This permit does not grant any property rights or exclusive privileges.
  - c. This permit does not authorize any injury to the property or rights of others.
  - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
  - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
  - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
  - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
  - d. Design or construction deficiencies associated with the permitted work.

- e. Damage claims associated with any future modification, suspension, or revocation of this permit.
- 4. **Reliance on Applicant's Data:** The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
- 5. **Reevaluation of Permit Decision.** This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
  - a. You fail to comply with the terms and conditions of this permit.
  - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
  - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

- 6. **Extensions.** General condition 1 establishes a time limit for the completion of the activity authorized by this permit, Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

\_\_\_\_\_  
 (PERMITTEE) **POTASH CORPORATION OF SASKATCHEWAN**  
**PHOSPHATE DIVISION, AURORA MINE**

\_\_\_\_\_  
 (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

\_\_\_\_\_  
 (DISTRICT ENGINEER) **JEFFERSON M. RYSCAVAGE, COLONEL**

\_\_\_\_\_  
 (DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

\_\_\_\_\_  
 (TRANSFEEE)

\_\_\_\_\_  
 (DATE)

## SPECIAL CONDITIONS

Action ID. 200110096

### MINING

- A) This permit authorizes mining and mine related impacts as described fully in the FEIS within the boundary depicted in the attached maps labeled "Modified Alt L – NCPC Proposed Impact Boundary" dated May 28, 2009 and "Modified Alt L – Bonnerton Proposed Impact Boundary" and "Modified Alt L – South of 33 Proposed Impact Boundary", as presented May 18, 2009. All work authorized by this permit must be performed in strict compliance with these attached plans, which are a part of this permit. Any modification to these plans must be approved by the U.S. Army Corps of Engineers (USACE) prior to implementation.
- B) Within 1 year of the issuance date of this permit, the Permittee shall demarcate the outer limits of disturbance on the NCPC tract by establishing a cleared line at least 10 feet and not to exceed 40 feet along the Impact Boundary as identified in the attached map labeled "Modified Alt L – NCPC Proposed Impact Boundary" as presented May 18, 2009. Additionally, the Permittee shall, within 1 year of the issuance of this permit work with the Corps to identify locations and establish permanent monuments identified with GPS coordinates to further demarcate this boundary on the NCPC Tract. No less than 1 year prior to relocating any mine related activity to the Bonnerton or S33 Tracts, the Permittee shall undertake identical actions within these tracts utilizing the information provided on the "Modified Alt L – Bonnerton Proposed Impact Boundary" and "Modified Alt L – South of 33 Proposed Impact Boundary", as presented May 18, 2009, respectively. This will facilitate compliance monitoring by establishing long-term reference points.
- C) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- D) Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.
- E) Figure 2 of the Record of Decision (ROD) included and incorporated here by reference depicts approximate timing of the requirement for major pre- mining, land manipulation and clearing impacts and is incorporated here by reference. Table 3 of the ROD included and incorporated here by reference lists those impacts and the

years in which they will occur. These yearly figures are estimates. Actual timing and area may be in part determined by several factors including but not limited to site and equipment constraints, weather, and economics. However, to ensure that temporal losses are minimized to the extent practicable, the Permittee shall not undertake major land-clearing and/or land manipulating activities within any area sooner than 1 year prior to the dates indicated on this figure. For example, major land clearing and manipulation activities within the block labeled 2012-2013 may not begin any sooner than January 1, 2011.

### RECLAMATION

- F) The Permittee shall undertake full reclamation of all areas mined under this authorization as described in Section 4.3 of the EIS. This includes reestablishment of varied topography and drainage ways. Figure 3 of the ROD included and incorporated here by reference indicates the required completion date for the capping and successful vegetation of mine reclamation areas. To demonstrate adherence to this schedule, the Permittee shall submit to the Corps an annual summary detailing all reclamation efforts complete within the previous year and indicating the degree of completeness of each reclamation area. Any deviation from the reclamation schedule will be addressed in these reports and the report shall include an explanation for the deviation and proposed remedial action.
- G) The Permittee shall cap all mined areas that are reclaimed with the gypsum-clay blend process materials. The goal of the cap will be a minimum 3-foot thick cap of overburden material (similar to background soils from the region) over 100% of the blend areas. Minimal acceptable performance standards in achieving this cap are as follows: 70% of the total surface area with a minimum of 3-foot cap; 25% of the total surface area with a minimum of 2-foot cap; 5% of the total surface area unspecified.
- H) Following successful completion of the capping requirements within each reclamation area, the Permittee shall submit an as-built report including final topographical surveys for the reclamation areas. This report shall contain final cap depth and coverage information. This report shall further include an explanation of site development that will minimize erosion, eliminate contaminant transportation from the clay/gypsum blend through any waterway or drainage area, and facilitate the development of a mature vegetated riparian buffer. Finally, this report shall include information on surface water retention within the reclamation area and flows within and from the reclamation area.
- I) To minimize temporal impacts and accelerate the return of watershed functions within the reclamation areas, the Permittee shall to the extent appropriate and practicable apply an average of 1-foot of topsoil cover to the reclaimed areas utilizing the topsoil removed prior to site mining. This topsoil addition should be concentrated within and around areas of surface water flow and/or retention.

- J) To the extent appropriate and practicable, upland portions of the reclamation area shall be replanted, in longleaf pine (*Pinus palustris*) and wetland areas shall be replanted in bald cypress (*Taxodium distichum*) and/or Atlantic white cedar (*Chamaecyparis thyoides*) if Atlantic white cedar is shown to do well on the reclamation sites. It is suggested that the Permittee work with the Corps, the USFWS and any other interested parties to determine growth and survivability of these and other species utilizing areas currently being reclaimed under the previous permit action.
- K) Within 2 years of the issuance of this permit, the Permittee shall work with the Corps and NCDWQ to develop a plan to monitor the quality of water discharged from the reclamation areas into the surrounding watersheds. The Permittee shall seek input from all appropriate and interested agencies including but not limited to EPA, USFWS, NFMS, NCWRC, NCDMF, NCDCM and NCDLR in developing this monitoring plan. This plan shall include monitoring of radionuclides, total and dissolved phosphorus, nitrate nitrogen, ammonia nitrogen, particulate nitrogen, dissolved Kjeldahl nitrogen, and dissolved and particulate organic carbon. Data collected will be used to manage water within the reclamation areas to optimize both the amount and quality of those waters being released. It is suggested that the applicant initiate pilot studies in the areas currently being reclaimed.

### MITIGATION

- L) Compensatory mitigation identified in the document entitled "Compensatory Section 404/401 Mitigation Plan: Comprehensive Approach" as presented in Appendix I of the FEIS shall be accomplished pursuant to that Plan and/or any subsequent Corps approved modification or amendment. Construction and monitoring of each site shall be conducted according to each site-specific mitigation plan and the schedule presented in Table 3 of the ROD included and incorporated here by reference.
- M) Within one year of the issuance of this permit, the Permittee shall cause to be recorded, a preservation mechanism acceptable to the Corps for the permanent protection of the area identified for preservation in the "South Creek Corridor" plan.
- N) Table 2 of the ROD lists the impacts as they would occur during 2-year timeframes and is included by reference in Condition "E" above. By November 1<sup>st</sup> of the year preceding the permitted impact, the Permittee shall submit to the Corps and NCDWQ, a mitigation ledger demonstrating that all mitigation work is complete as described in the mitigation plan and pursuant to the identified timetable. This ledger will be used to determine whether sufficient mitigation is available for impacts occurring over the next 2-year timeframe. For Example, by November 1<sup>st</sup> 2009, the Permittee shall submit a ledger demonstrating that sufficient mitigation for impacts occurring during

the 2010 – 2011 timeframe (526.56 ac) is completed. Should the ledger indicate that insufficient mitigation exists to compensate for the next 2-year timeframe, the Permittee shall work with the Corps to develop a strategy to ensure that the mitigation requirement is satisfactorily met prior to those impacts occurring.

- O) The Permittee shall submit yearly monitoring reports for each mitigation site. Monitoring reports will be submitted by the dates specified within each site-specific mitigation plan. Monitoring will continue until such time as the Corps deems the mitigation site successful and confirms in writing that monitoring may be discontinued.
- P) Once compensatory mitigation sites have been deemed successful and the Corps has agreed in writing that monitoring may cease, the Permittee shall, within one year of the date of that correspondence, cause to be recorded an acceptable preservation mechanism ensuring the permanent protection of all mitigation sites.

#### MONITORING

- Q) As required by the State Water Quality Certification, the Permittee shall work with the Corps and the NC Division of Water Quality to establish a monitoring plan for groundwater in and around mine and reclamation areas. At a minimum, this plan shall include sufficient monitoring within and surrounding the reclamation areas to ensure that heavy metal/toxic pollutants including cadmium and radionuclides are not entering the groundwater. The monitoring plan shall also include nitrate nitrogen, sulfate, chloride, total phosphorus, sodium, TDS, and pH. It is suggested that this monitoring commence with monthly samples until such time as the NCDWQ and the Corps in consultation with all interested and appropriate agencies determines sufficient baseline information exists. After such time, samples will be collected and analyzed every 3 months until blend material is introduced to the reclamation area. Following introduction of the blend material to the reclamation site, monthly sampling will recommence until such time as the NCDWQ and the Corps in consultation with all interested and appropriate agencies determines another sampling timeframe is appropriate. Yearly results of this monitoring shall be reported to the Corps and NCDWQ no later than January 31 of the year following data collection. The permittee and/or the Corps will make these reports available in whole or in summary to any interested party. If increases in the levels of any sampled substance are observed for more than 1 sampling occurrence in any given year, or for more than 1 year, the permittee shall include in the yearly report, a plan for mitigating the effect or satisfactory justification as to why no action is necessary. If the Corps, in consultation with other agencies, including but not limited to NCDWQ, NCDLR and EPA, determines that the current



reclamation practices are causing an unacceptable adverse impact to groundwater, the DE may modify, suspend or revoke the permit.

- R) Prior to introducing the gypsum/clay blend in the reclamation of any mined area covered by this permit, the Permittee shall submit to the Corps and NCDWQ a remediation strategy in anticipation of the possibility of heavy metal or radionuclide contamination of groundwater or surface tributaries that drain or are adjacent to mined areas. That strategy will be made available for public review.
- S) In concert with the monitoring requirements contained in the Water Quality Certification, the Permittee shall develop a Plan of Study to address the effects of the reduction in headwater wetlands on the utilization of Porters Creek, Tooley Creek, Jacobs Creek, Drinkwater Creek, and Jacks Creek as nursery areas by resident fish and appropriate invertebrate species. This plan shall be submitted to the Corps and NCDWQ for approval within 1 year of the issuance of this permit. At a minimum, the plan shall address the following issues:
- 1) Has mining altered the amount or timing of water flows within the creeks?  
Data collection may include:
    - i) Continuous water level recorders to measure flow
    - ii) Rain gauges to measure local water input
    - iii) Groundwater wells to measure input to the creeks
    - iv) Semi-continuous salinity monitoring
    - v) Periodic DO monitoring (continuously monitored for several days at strategic times of year)
  - 2) Has mining altered the geomorphic or vegetative character of the creeks?  
Data collection may include:
    - i) Annual aerial photography to determine creek position, length, width, sinuosity
    - ii) Annual cross sectional surveys of each creek at established locations
    - iii) Annual sediment characterization
    - iv) Annual vegetation surveys along creeks
    - v) Spring and fall sediment surface chlorophylls or organic content in vegetation zone.
    - vi) Spring and fall location of flocculation zones with each creek.
  - 3) Has mining altered the forage base of the creeks? Data collection may include:
    - i) Spring and fall benthic cores to sample macroinfauna.
    - ii) Spring and fall benthic grabs focused upon bivalves, such as *Rangia* sp.

- iii) Periodic sampling for pelagic species such as grass shrimp, blue crabs, and small forage fish. Sampling gears would be chosen to reflect ontogenetic shifts in creek usage.
- 4) Has mining altered the use of the creeks by managed fish? Data collection may include periodic sampling for species managed under the Magnuson-Stevens Fishery Conservation Management Act. Sampling would occur during appropriate times of year and gears would be chosen to reflect ontogenetic shifts in creek usage.
- 5) Has mining increased contaminate levels within creek sediments to levels that could impact fish or invertebrates? Data collection may include annual sediment and water column sampling for metals, including cadmium, mercury, silver, copper, and arsenic. If elevated levels are detected, the availability and uptake by appropriate aquatic species (e.g., *Rangia* sp., blue crabs) should be measured using appropriate bioassay techniques.
- 6) Has mining altered overall water quality within creeks? Water quality parameters analyzed will include: Salinity, Temperature, Dissolved Oxygen, pH, Secchi depth, Turbidity, Chlorophyll a, Dissolved orthophosphate phosphorus, Total dissolved phosphorus, Particulate phosphorus, Nitrate nitrogen, Ammonia nitrogen, particulate nitrogen, and Dissolved Kjeldahl nitrogen.
- T) Monitoring under the Plan of Study referenced in condition "S" above shall commence immediately upon the Plan's approval by the Corps and NCDWQ. Monitoring shall continue for 10 years following the completion of all reclamation work within the headwaters of the subject creeks unless the Corps, in consultation with the appropriate resource agencies agrees that monitoring can be discontinued.

#### **REPORTING AND ADAPTIVE MANAGEMENT**

- U) The Permittee shall within 6 months of the issuance date of this permit, work with the Corps and NCDWQ to establish an independent multidisciplinary panel of researchers qualified in the subject matter to be examined (Science Panel). In identifying potential participants for this Panel, the Permittee shall seek input from all interested and appropriate resource agencies including but not limited to EPA, NMFS, USFWS, NCWRC, NCDMF, and the appropriate permitting agencies including NCDCM, NCDLR. The panel shall be comprised of between 2 and 5 members. The members of this panel shall be given opportunity to provide input and recommendations on the monitoring required by conditions "K" and "S" above including research design, reference site selection, sampling stations, schedules, and methods; laboratory

methods; data management and analysis; and quality control and quality assurance. Any input supplied by members of this panel will be presented to the Corps and NCDWQ and will be incorporated as appropriate into the preparation of the Plan of Study referenced in condition "S". Members of this panel will also be given the opportunity to oversee all research conducted toward fulfillment of conditions "K" and "S".

V) The Permittee shall be responsible for fully implementing the approved Plan of Study referenced in conditions "S", "T" and "U" above. Annual summaries of all data collected in compliance with conditions "K" and "S" shall be presented to the Corps, NCDWQ and all members of the Science Panel on or before May 1 of the year following collection. The Permittee and/or the Corps will make these reports available in whole or in summary to any interested party.

W) The Permittee shall coordinate and facilitate an annual meeting of the Science Panel, the Corps, NCDWQ, and all other interested state and federal agencies including but not limited to EPA, NMFS, USFWS, NCWRC, NCDMF, NCDCM, NCDLR. This meeting shall occur no later than July 30 of each year. The purpose of this meeting will be to allow the members of the Science Panel to provide input to the agencies on any observed trends in parameters measured and general discussions on whether direct and indirect impacts from mining and benefits from the compensatory mitigation appear to be in accordance with expectations at the time of permitting. Members of the Science Panel shall also be given the opportunity to provide any recommendations for management or further study. The proceedings of this meeting including data summaries, reports, presentations and any conclusions of the group will be made available in whole or in summary to any interested party. The Corps will fully consider all information presented by the Science Panel as well as comments from state and federal agencies and all other parties supplying input to determine if corrective actions or permit modifications are needed. If substantive changes to the mine plan, compensatory mitigation plan or monitoring plan are made, the Corps will announce such change by Public Notice and allow for public comment.

X) At appropriate intervals to be decided by the Corps after input from the Science Panel (eg. 3 to 5 years) beginning from the date of permit issuance, members of the panel shall be given the opportunity to review the monitoring methods, sampling locations, parameters analyzed, and other elements of monitoring protocol to determine if modifications to the plan are appropriate. All data reviewed by the panel shall be made available to the public.

## MISCELLANEOUS

- Y) The Permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.
- Z) The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.
- AA) The Permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).
- BB) The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to an acceptable condition.
- CC) Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the Permittee's discovery of the violation.
- DD) Wetland Avoidance/Minimization Areas: The Permittee shall avoid the remaining 2,445 acres of waters of the United States within the 15,100 acre project area. These natural wetland areas were avoided as part of the permit application review process and therefore will not be disturbed by any dredging, filling, mechanized land clearing, agricultural activities, or other construction work whatsoever. The Corps reserves the right to deny review of any requests for future impacts to these natural wetland areas. In addition, within one year of the date of this permit, the Permittee shall cause to be recorded a conservation instrument acceptable to the Corps for the permanent preservation of the areas identified as conservation easements on maps entitled "Conservation easement - Tooley Creek Modified Alternative L - NCPC;" "Conservation Easement - Jacobs Creek Modified Alternative L

- NCPC;" "Conservation Easement - Drinkwater Creek Modified Alternative L - NCPC;" "Conservation Easement - Jacks Creek Modified Alternative L - NCPC;" and "Conservation Easement - Porter Creek Modified Alt L - Bonnerton" all dated May 18, 2009 and attached here.

EE) The Permittee shall not begin work authorized by this permit until 10 days following the date I provide the Record of Decision to EPA. I expect to provide the ROD to EPA on June 4, 2009; however, the permittee shall verify that date prior to beginning work.



Beverly Eaves Perdue, Governor  
Dee Freeman, Secretary  
North Carolina Department of Environment and Natural Resources  
Coleen H. Sullins, Director  
Division of Water Quality

January 15, 2009

Mr. Ross M. Smith, Manager  
Environmental Affairs  
PCS Phosphate Company, Inc.  
P.O. Box 48  
Aurora, NC 27808

Re: PCS Phosphate Mine Expansion, Beaufort County  
DWQ #2008-0868, version 2.0; USACE Action ID. No. 200110096  
**MODIFIED APPROVAL of 401 Water Quality Certification with Additional Conditions**

Dear Mr. Smith:

Attached hereto is a copy of Certification No. 3771 issued to PCS Phosphate Company, Inc. of Aurora, NC, dated January 15, 2009. In addition, you must get any other federal, state or local permits before you proceed with your project including (but not limited to) Solid Waste, Sediment and Erosion Control, Stormwater, Dam Safety, Mining, Non-discharge and Water Supply Watershed regulations. This Certification completely replaces one issued to you on December 6, 2008.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Coleen H. Sullins

CHS/jrd

Attachments: Certificate of Completion

cc: Mr. Tom Walker, U.S. Army Corps of Engineers, Asheville Regulatory Field Office  
Dave Lekson, US Army Corps of Engineers, Washington Regulatory Field Office  
Scott McLendon, Wilmington District, USACOE  
Kyle Barnes, DWQ, Washington Regional Office  
Al Hodge, DWQ, Washington Regional Office  
DLR Washington Regional Office  
File Copy  
Matt Matthews, DWQ Wetlands and Stormwater Branch  
Cyndi Karoly, DWQ  
John Payne, NC Attorney General's Office, Environmental Division  
Mike Schafele, NC Natural Heritage Program

Linda Pearsall, NC Natural Heritage Program  
Jimmie Overton, DWQ  
Jeff Furness, PCS Phosphate  
Stephen Rynas, NC Division of Coastal Management  
Shannon Deaton, NC Wildlife Resources Commission  
Derb Carter, Southern Environmental Law Center  
Geoffrey Gisler, Southern Environmental Law Center  
Heather Jacobs, Pamlico Tar River Foundation  
Sean McKenna, NC Division of Marine Fisheries  
Eric Kulz, DWQ  
Tammy Hill, DWQ  
Becky Fox, US Environmental Protection Agency  
Tom Welborn, US Environmental Protection Agency – Region 4 Atlanta  
Melba McGee, DENR  
Dee Freeman, DENR  
Coleen Sullins, DWQ  
Chuck Wakild, DWQ  
Paul Rawls, DWQ  
Ted Strong, Washington Daily News  
Susan Massengale, DWQ  
Julia Berger, CZR  
George House, Brooks, Pierce, McLendon, Humphrey and Leonard, LLP  
Jim Stanfill, EEP  
Mary Penny Thompson, DENR  
Susan Massengale, DWQ  
Ann Deaton, NC Division of Marine Fisheries  
John Hennessy, DWQ  
Ted Strong, Washington Daily News  
Wade Rawlins, News and Observer

Filename: 20080868v2PCSPhosphate(Beaufort) 401 modified

### NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500 to PCS Phosphate Company, Inc. of Aurora, NC based on an application to fill 4,124 acres of jurisdictional wetlands, 29,288 linear feet of streams, 19 acres of ponds and 55.14 acres of stream buffers in the Pamlico River Basin, associated with the expansion of PCS Phosphate's mining operation including the relocation of Highway 306 and Sandy Landing Road in Beaufort County, North Carolina, pursuant to an application filed on the 22nd day of May of 2008 through the published Public Notice by the US Army Corps of Engineers, and in additional correspondence received September 5, 2008 (dated September 4, 2008), November 3, 2008 (received November 5, 2008), December 19, 2008 (received December 22, 2008) and proposed impact maps dated January 6, 2009.

The application and supporting documentation provide adequate assurance that the proposed work will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application, the supporting documentation, the additional correspondence noted above and conditions hereinafter set forth.

This approval is only valid for the purpose and design submitted in the application materials, additional correspondence and as described in the Public Notice. If the property is sold after the Certification is granted, the new owner must be given a copy of the Certification and approval letter and is thereby responsible for complying with all conditions of this Certification. Any new owner must notify the Division and request the Certification be issued in their name. Should wetland, buffer or stream fill be requested in the future, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). If any plan revisions from the approved site plan result in a change in stream, buffer or wetland impact or an increase in impervious surfaces, the DWQ shall be notified in writing and a new application for 401 Certification may be required and a modified 401 Certification may be required. For this approval to be valid, compliance with all the conditions listed below is required.

#### Conditions of Certification:

##### 1. Impacts Approved

The following impacts are hereby approved as long as all of the other specific and general conditions of this Certification are met. No other impacts are approved including incidental impacts other than listed in this table. Also, please note that these impacts are those approved by DWQ and are only a portion of the impacts that were originally applied for and listed in the Public Notice. These impacts are depicted on maps entitled "PCS Phosphate Mine Continuation - Modified Alt. L - NPCS, Bonneron and South of 33 Proposed Impact" dated January 6, 2009.



	Amount Approved (Units)	Plan Location or Reference
Streams	25,727 feet	Final EIS, page e as well as June 6, 2008 and December 19, 2008 submittals to DWQ
404/CAMA Wetlands	3,953 acres	Final EIS, page e as well as June 6, 2008 and December 19, 2008 submittals to DWQ
Waters	19 acres	Final EIS, page e as well as June 6, 2008 and December 19, 2008 submittals to DWQ
Buffers	47.87 acres	Final EIS, page e as well as June 6, 2008 and December 19, 2008 submittals to DWQ

Sediment and Erosion Control:

2. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:
  - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
  - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
  - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
  - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act or Mining Act of 1971 (as amended).
3. No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the 404/401 Permit Application. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices, shall be performed so that no violations of state water quality standards, statutes, or rules occur.
4. Sediment and erosion control measures shall not be placed in wetlands or waters without prior approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands or stream beds or banks, adjacent to or upstream and down stream of the above structures. All sediment and erosion control devices shall be removed and the natural

grade restored within two (2) months of the date that the Division of Land Resources or locally delegated program has released the project.

Continuing Compliance:

5. PCS Phosphate Company, Inc. shall conduct construction activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with section 303(d) of the Clean Water Act), the 401 Water Quality Certification rules (15A NCAC 2H .0500) and any other appropriate requirements of State law and federal law. If the Division determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the Division may reevaluate and modify this Certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H .0507(d). Before modifying the Certification, the Division shall notify PCS Phosphate Company, Inc. and the US Army Corps of Engineers, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to PCS Phosphate Company, Inc. in writing, shall be provided to the United States Army Corps of Engineers for reference in any Permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project. This condition is intended to conform with the provisions of 15A NCAC 2H .0507 (d).

Mitigation:

6. Wetland and stream mitigation shall be done as follows and in accordance with mitigation as approved by the US Army Corps of Engineers. DWQ shall be copied on all draft mitigation plans and copied on all annual reporting on mitigation success. In addition, buffer mitigation shall be done in accordance with condition 7 below. In addition, DWQ shall be copied on a final accounting of the amount and type of proposed wetland, stream and buffer mitigation within 60 days of the issuance of the 404 Permit from the US Army Corps of Engineers. Any mitigation done outside the 8-digit HUC where PCS is located should follow the guidance for out of HUC mitigation as described in "Guidance on the Use of Compensatory Mitigation in Adjacent Cataloging Units" dated May 20, 2005 or its update by DWQ. Conservation easements or similar mechanisms to protect these mitigation sites shall be recorded on all mitigation sites to the written satisfaction of the US Army Corps of Engineers.
7. Buffer mitigation shall be conducted by PCS Phosphate at those mitigation sites with riparian buffer credit which total about 24.4 acres of buffer credit. If the Environmental Management Commission approves a flexible buffer mitigation program, then PCS Phosphate may submit a list and description of those sites to DWQ for written approval. If no additional riparian buffer mitigation sites and no flexible buffer mitigation sites are approved by DWQ and/or the NC Environmental Management Commission, then disturbance of buffers in the NCPC, Bonneron or South of 33 tracts shall not be done beyond the limits of the 2014 impact area shown on PCS' Project Impact Schedule Year 2008-2016 (generally south of Drinkwater Creek) (see Attachment One). DWQ shall be copied on all buffer mitigation site plans and written approval from DWQ is required for these plans before planting or land grading occurs.

8. Porter Creek enhancement – Additional written approval is required from DWQ for a wetland enhancement and stream restoration plan as well as a monitoring plan for the stream, headwater forest and hardwood flat at the upper end of Porter Creek. This plan shall include plugging or filling the existing ditch in order to reestablish surface flow into the wetland and stream channel. DWQ acknowledges wetland functional uplift for the 3.4 acre hardwood flat that is located between the stream and existing ditch and will count 1.7 acres of functional uplift of these non-riparian wetlands in order to account for DWQ's mitigation requirement in 15A NCAC 2H .0506 (h)(6). Stream mitigation credits are also available for the restoration of flow into the existing channel with appropriate monitoring and wetland mitigation for the functional uplift of the headwater forest if additional analysis documents that uplift.

Additional Minimization of impact:

9. Hardwood Flat Avoidance and Minimization – Impact to the 135 acre ("135 A" on Attachment Two) portion, the 58 acre (" 58 A" on Attachment Two) portion and the 20 acre secondary connection between these two locations ("20 acre connect" on Attachment Two) of the Bonnerton Road Non-Riverine Wet Hardwood Forest as depicted on Exhibit A of the letter dated October 20, 2008 from George House of Brooks, Pierce, McLendon, Humphrey and Leonard, LLP to Paul Rawls of the NC Division of Water Quality shall be avoided and the area not mined or cleared since this wetland is a "wetland of exceptional state or national ecological significance" in accordance with 15A NCAC 2H .0506(e) except that a 1,145 foot wide mining and utility corridor is allowed in the narrowest part of the Bonnerton Road Non-Riverine Wet Hardwood Forest. Mining is also allowed in the northeast triangle of "58A" WHR area as outlined in exhibit 14 of PCS's December 19, 2008 letter. In order to protect the uses of this Non-Riverine Wet Hardwood Forest wetland that will not be mined, a conservation easement shall be placed on the wetland and restored mining and utility corridor to preclude impacts including mining, logging and any other disturbance of the vegetation or soils that would result in its delisting as a state or nationally significant wetland area. This conservation easement shall be sent to DWQ within 60 days of the issuance of the 404 Permit and the Division must review and approve this easement before it is recorded. Eventual donation to a local land trust or similar organization is acceptable to DWQ with DWQ's written approval.

The exact location of this 1,145 foot wide mining corridor shall be submitted to DWQ and the Corps of Engineers for written approval. A detailed stratigraphy study shall be done on both sides and throughout the area to be mined in order to determine the presence, extent and permeability of any aquitards and aquicludes (mainly clay-based) within the mining corridor. A plan for restoration of each of these aquitards and aquicludes shall be included with the revegetation plan in order to ensure that pre-mining hydrology is reestablished in the mining corridor. Additional written approval is needed from DWQ before this stratigraphic study is done or restoration is initiated. Groundwater monitoring shall be done before, during and after mining and restoration for at least 10 years post-mining in order to ensure that restoration has established reference hydrology for this site. In addition, a reclamation and revegetation plan for the mining corridor shall be submitted to DWQ for written approval. The reclamation plan for the mining corridor shall include the installation of appropriate topsoil on the site within the rooting zone of the restored hardwood flat. The width of the reclamation zone shall ensure that a continuous hardwood flat is restored to reconnect the two undisturbed hardwood flats with a width similar to the width of the remnant, undisturbed hardwood flats. Revegetation shall be done with native tree species. The mining corridor shall be restored and replanted within ten (10) years of the initiation of mining preparation

for the area. DWQ shall be copied on a letter once that mining preparation begins on the mining corridor in order to establish this ten year clock.

10. Additional minimization of appx. 3 acres of wetland impact shall be provided for the NCPC tract as depicted on the letter from PCS Phosphate dated November 3, 2008 to John Dorney of the NC Division of Water Quality.
11. South of 33 tract – The impact boundaries for the South of 33 tract shall be as outlined in an email from Mr. Tom Walker of the US Army Corps of Engineers dated August 19, 2008 (forwarded to Mr. John Dorney of the Division of Water Quality on December 13, 2008).

#### Monitoring

12. Groundwater monitoring – Additional written approval is required from DWQ for a final groundwater monitoring plan that supplements and compliments the existing groundwater monitoring that is being conducted by PCS for various state and federal agencies. In addition to other parameters subject to groundwater standards, cadmium and fluoride shall be monitored in the final groundwater monitoring plan. This plan shall include groundwater monitoring of the protected portion of the Bonnerton Road Non-Riverine Wet Hardwood Forest as noted in condition 9 above in order to ensure that the existing hydrology of this site is maintained. This monitoring shall focus on the "58A" area of the Bonnerton Road Non-Riverine Wet Hardwood Forest to ensure that its groundwater hydrology is maintained.
13. Stream and watershed monitoring – The existing water management and stream monitoring plan for water quality, water quantity and biology (macroinvertebrates and fish) shall be continued for the life of the Permit by the applicant. Additional monitoring shall be proposed by the applicant and approved by DWQ for tributaries in the Bonnerton and South of 33 tracts before land clearing or impacts occur to those locations. This additional monitoring plan shall collect data from a representative number of streams in each tract and be designed to assure the protection of downstream water quality standards including Primary and Secondary Nursery Area functions in tributaries to South Creek, Porter Creek, Durham Creek and the Pamlico River adjacent to the mine site. Monitoring locations shall include the upper end of Porter Creek in the "58A" portion of the Bonnerton Road Non-Riverine Wet Hardwood Forest in order to ensure that hydrology of this wet hardwood forest is maintained.

The plan shall identify any deleterious effects to riparian wetland functions including by not limited to water storage, pollutant removal, streambank stabilization, as well as resident wetland-dependent aquatic life and resident wetland-dependent wildlife and aquatic life in wetlands and streams tributary to the Pamlico River in the NCPC, Bonnerton and South of 33 tracts. If necessary, management activities to protect or restore these uses will be required for all the tributaries of these three tracts.

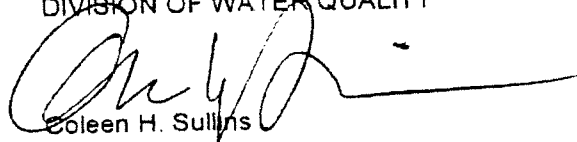
PCS shall notify DWQ in writing at least one month in advance of any biological sampling so DWQ biologists can accompany PCS biologists as needed. Also a certified lab is required for the identification of freshwater benthic macroinvertebrate samples. For estuarine samples, a knowledgeable lab shall be used until such time as DWQ certifies laboratories for estuarine analysis and after that time, only suitably certified labs shall be used. Finally a fish monitoring plan shall be included in the final monitoring plan submitted to DWQ for written approval.

This stream and watershed monitoring plan shall be submitted to DWQ for written approval within six months of the issuance of the 404 Permit. Seven copies (two hard copies and five CD's) of the draft plan and annual reports shall be submitted to DWQ for circulation and review by the public and other federal and state agencies.

Expiration of Certification – This approval to proceed with your approved impacts or to conduct impacts to waters as depicted in your application shall expire upon expiration of the 404 Permit with the proviso that changes to this Certification may be made in accordance with condition 5 (Continuing Compliance) above.

If this Certification is unacceptable to you, you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this modified Certification. Since as noted above, this Certification completely replaces the one issued to you on December 6, 2008, the sixty (60) day appeal period is for all the conditions of this modified Certification. Any request for adjudicatory hearing must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 15th day of January 2009  
DIVISION OF WATER QUALITY

  
Coleen H. Sullins

CHS/jrd

Alternative	Total Area	Waters of the US	Stream	% Total Area	% Total Waters of the US	% Total Stream
<b>Single Tract Alternatives</b>						
Base (NCPC)	3,608	2,549	55,528			
AP (NCPC only)	3,412	2,408	38,558	95	94	69
Base (S33 only)	8,686	1,701	43,209			
S33AP (S33 only)	7,743	1,130	33,486	89	66	77
<b>Holistic Alternatives</b>						
Base (holistic)	15,100	6,380	115,843			
EAPA/B	13,961	5,668	89,150	92	89	77
SJAA/B	12,892	5,030	2,508	85	79	2
Alt. M	12,572	4,592	36,999	83	72	32
Alt. L (mod)	11,343	3,927	22,435	75	62	19
SCRA/B	10,659	3,506	14,360	71	55	12
DL1B	9,033	2,285	13,845	60	36	12
No Action	5,745	0	0	38	0	0

**Table 1.** Comparison of impacts for each alternative. Impacts associated with single tract alternatives are compared only to the base area within that single tract. Impacts associated with holistic alternatives are compared to the total base area of the three tracts combined.

Site	Wetland (acres)			Stream (linear feet)		
	Restoration	Enhancement	Preservation	Restoration	Enhancement	Preservation
Bay city	565.0	0.0	119.0	3000.0		
Hell Swamp	885.0	46.0	41.0	19783.0		
Gum Run	27.0	0.0	0.0			
Parker Farm	245.0	162.0	196.0			3960
SC Corridor			1143.0			26736
P Lands	2075.0	381.0	135.0			
U Lands	608.0		117.0			
Upper Back Creek	116.0	38.0	18.0	7066.0		1149.0
Rutman	3342.0	129.0	701.0	8793.0	7994.0	
Sage Gut	105.0		2.0	5401		1006
<b>totals</b>	<b>7968.0</b>	<b>756.0</b>	<b>2472.0</b>	<b>44043.0</b>	<b>7994.0</b>	<b>32851.0</b>

Table 2. Wetland and stream mitigation by site and type.

By year	Impact	Site Complete	Available Credits*	Acre Credit Balance		Impact**	Available Credits***	Linear Feet Credit Balance
	Acres		Acres	Available - Impacted		Linear Feet	Linear Feet	Available - Impacted
2009	312.39	Gum Run, Parker Farm, Bay City, Upper Back Creek	576.5	264.08		4544	11087.8	7115.8
2010	506.56	Sage Gut, Hell Swamp	1666.0	1403.53		148	30794.8	37762.6
2011		Rutman	828.1	2231.63			11990.6	49753.2
2012	304.81		0.0	1917.82		1108.5		48910.2
2013		P Lands, U Lands	1493.7	3411.52				48910.2
2014	303.53		0.0	3087.99		4677		45104.2
2015			0.0	3087.99				45104.2
2016	203.58		0.0	2884.41		1358		43746.2
2017			0.0	2884.41				43746.2
2018	458.74			2425.67		10620.5		34562.2
2019				2425.67				34562.2
2020	528.79			1896.88		0		34562.2
2021				1896.88				34562.2
2022	592.38			1304.50		0		34562.2
2023				1304.50				34562.2
2024	476.17			828.33		11974.5		24467.2
2025				828.33				24467.2
2026	30.34			797.99		3862.5		21892.2
2027				797.99				21892.2
2028	45.19			752.80		763.5		21383.2
2029				752.80				21383.2
2030	2.1			750.70		0		21383.2
2031				750.70				21383.2
2032	0			750.70		0		21383.2
2033				750.70				21383.2
2034	5.86			744.84		0		21383.2
2035				744.84				21383.2
2036	15.76			729.08		1239		20557.2
2037				729.08				20557.2
2038	31.42			697.66		4366.5		17646.2
2039				697.66				17646.2
2040	26.39			671.27		0		17646.2
2041				671.27				17646.2
2042	75.11			596.16		832.5		17091.2
2043				596.16				17091.2
2044	6.61			589.55		0		17091.2
2045				589.55				17091.2
2046	2.06			587.49		0		17091.2
2047				587.49				17091.2
2048	0			587.49		0		17091.2

Table 3. Mitigation completion date and impact dates

\* an acre credit of wetland is comprised of 2:1 restoration, 3:1 enhancement or 8-10:1 preservation

\*\* This column reflects total mitigation linear feet needed after adjustments to stream quality (1:1 for poor, 2:1 for Fair and 3:1 for excellent)

\*\*\* A linear foot credit is comprised of 1:1 restoration, 2.5:1 enhancement or 5:1 preservation



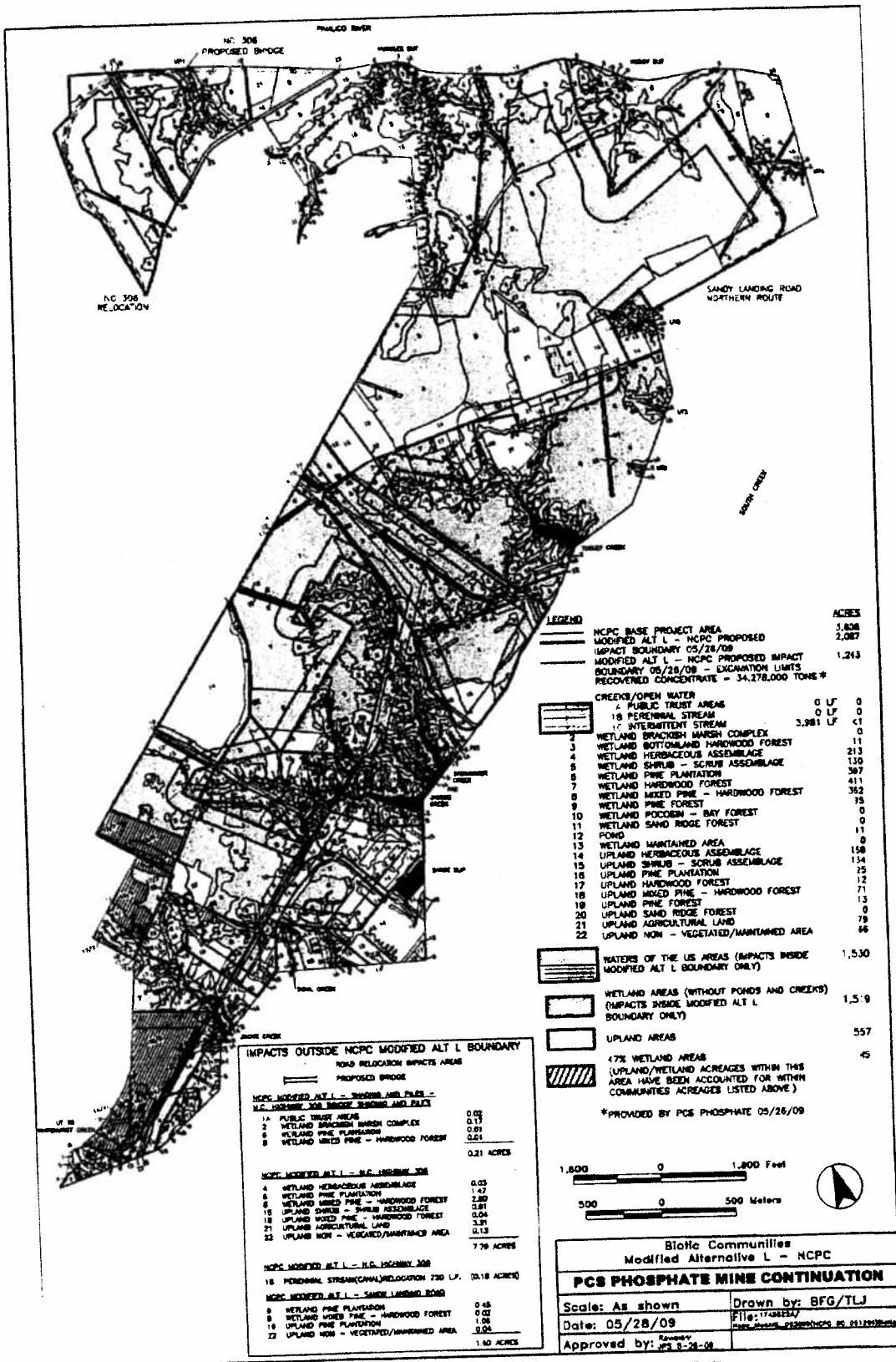


Figure 1A. Modified Alternative L mining alignment for NCPC

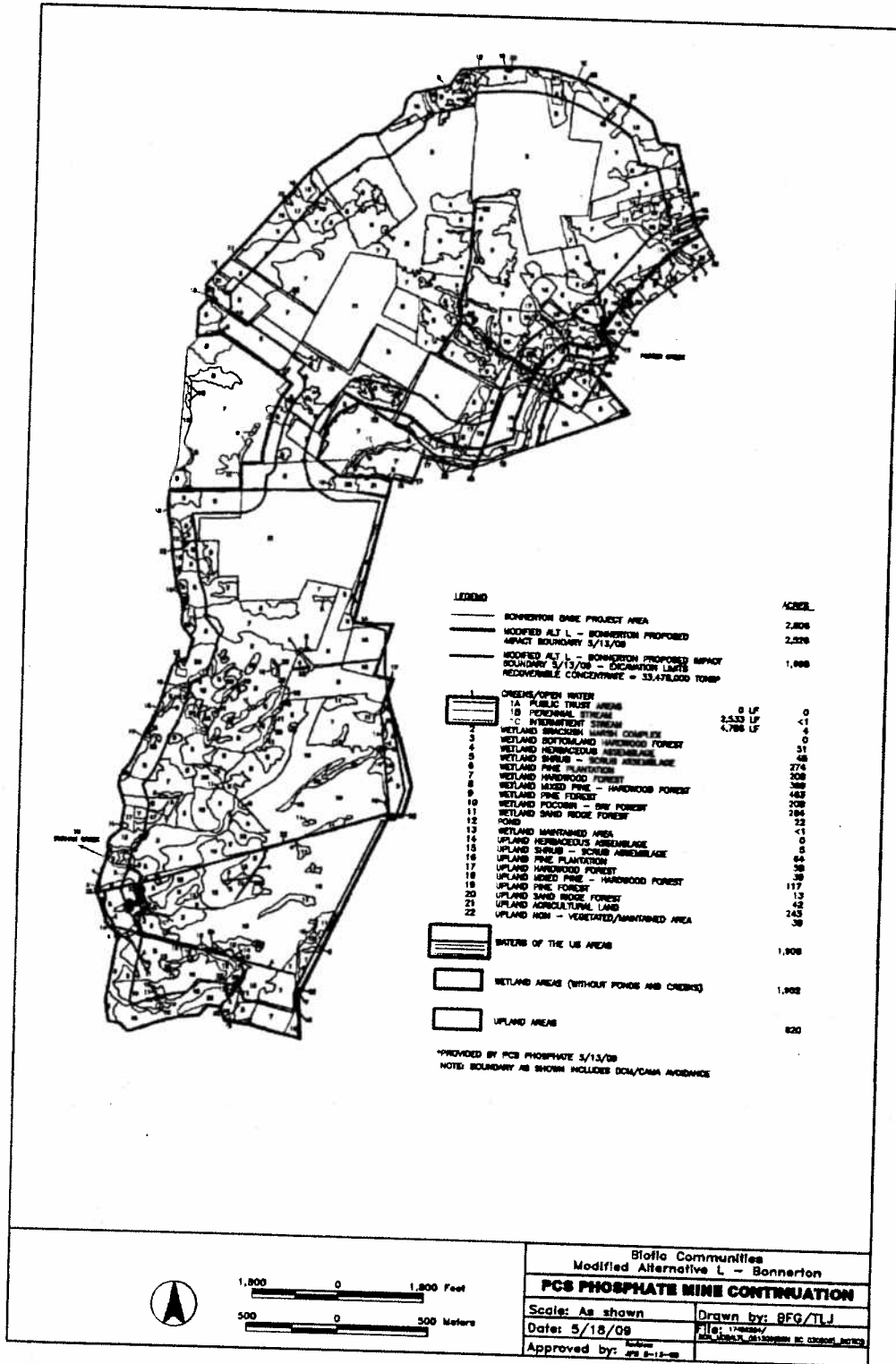


Figure 1B. Modified Alternative L mining alignment for Bonerton.

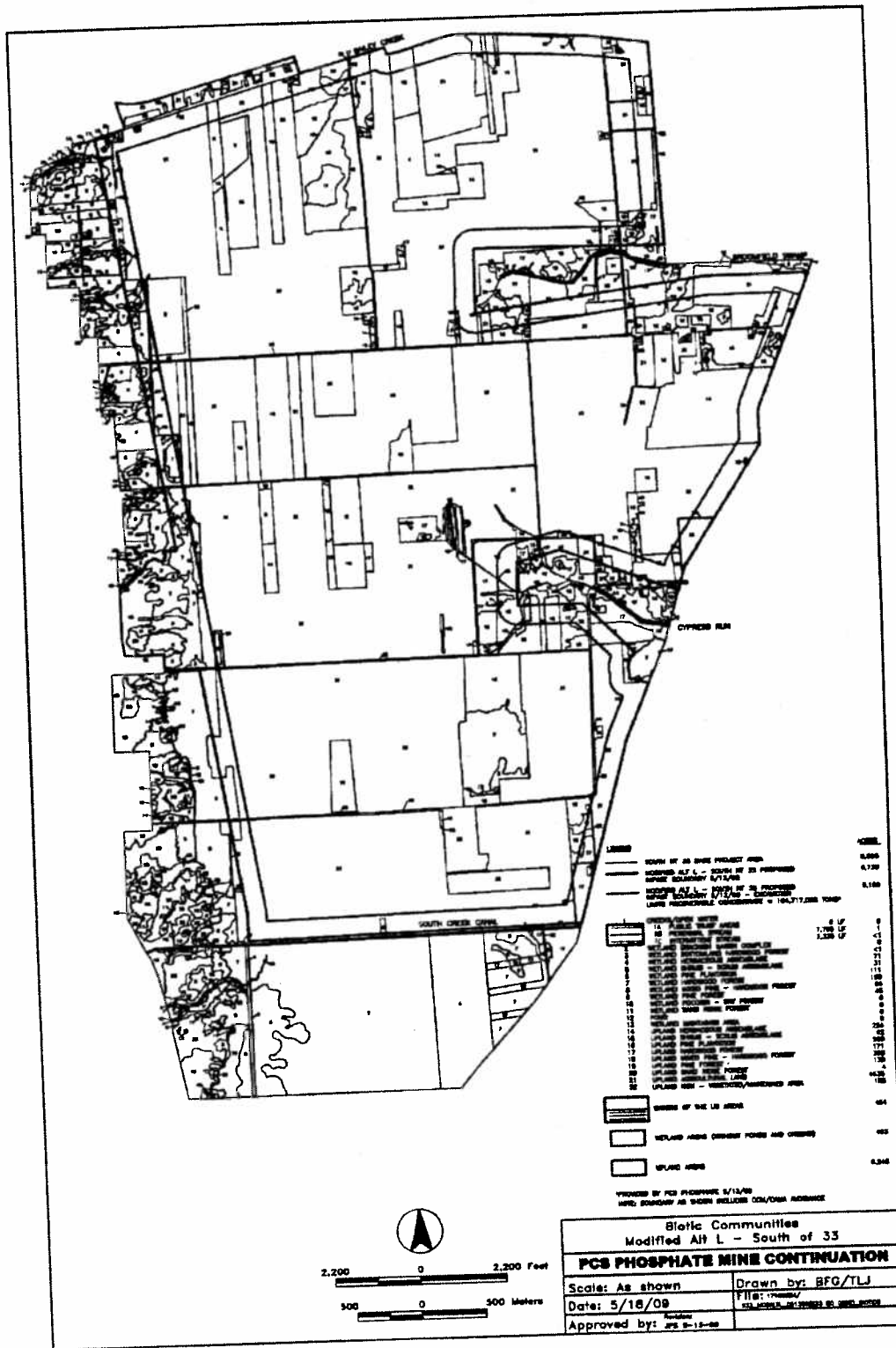


Figure 1C. Modified Alternative L mining alignment for S33.

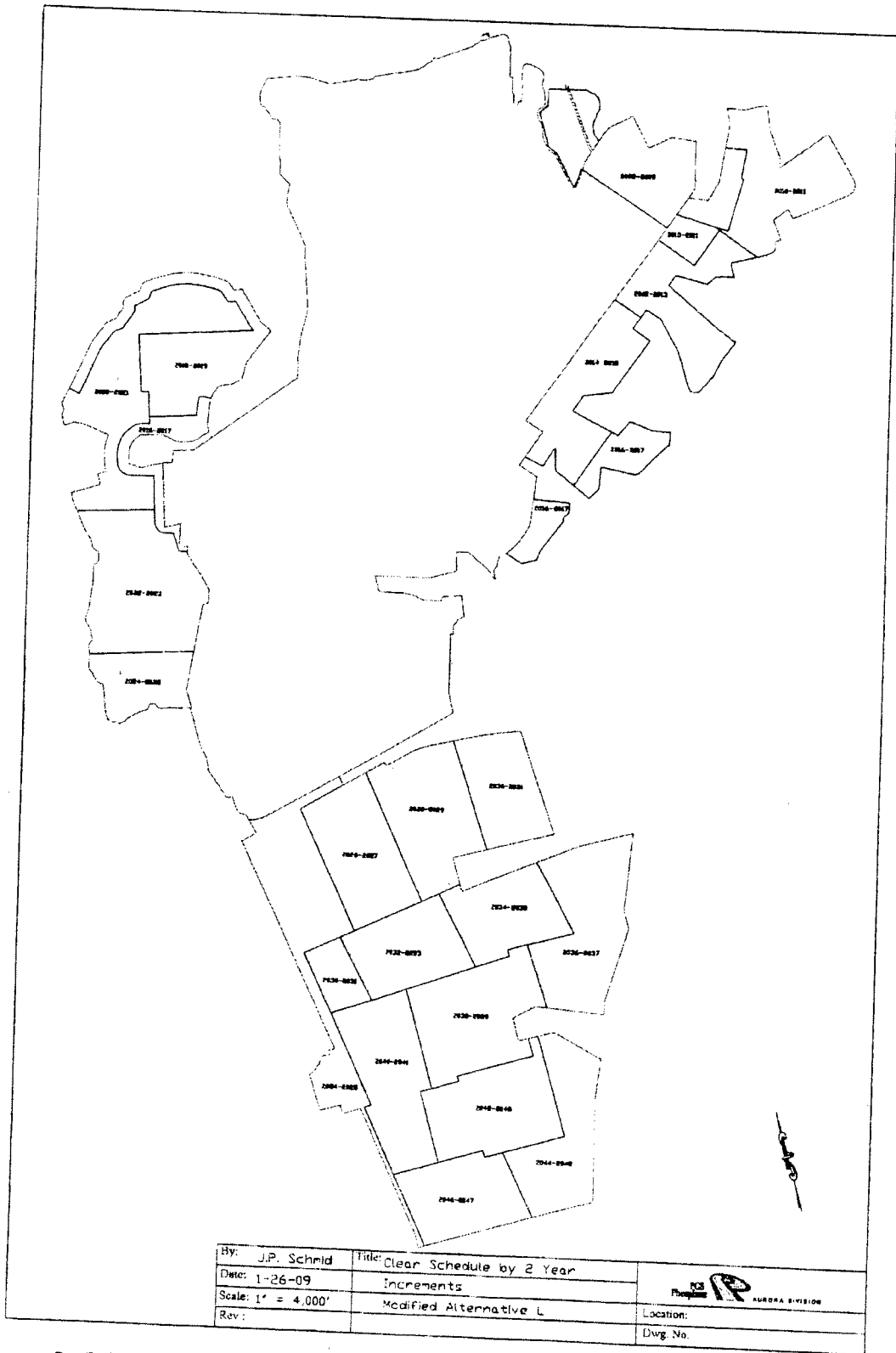


Figure 2. Initial impact schedule. This reflects dates when mechanized land clearing will be necessary in order to prepare for mine advance.

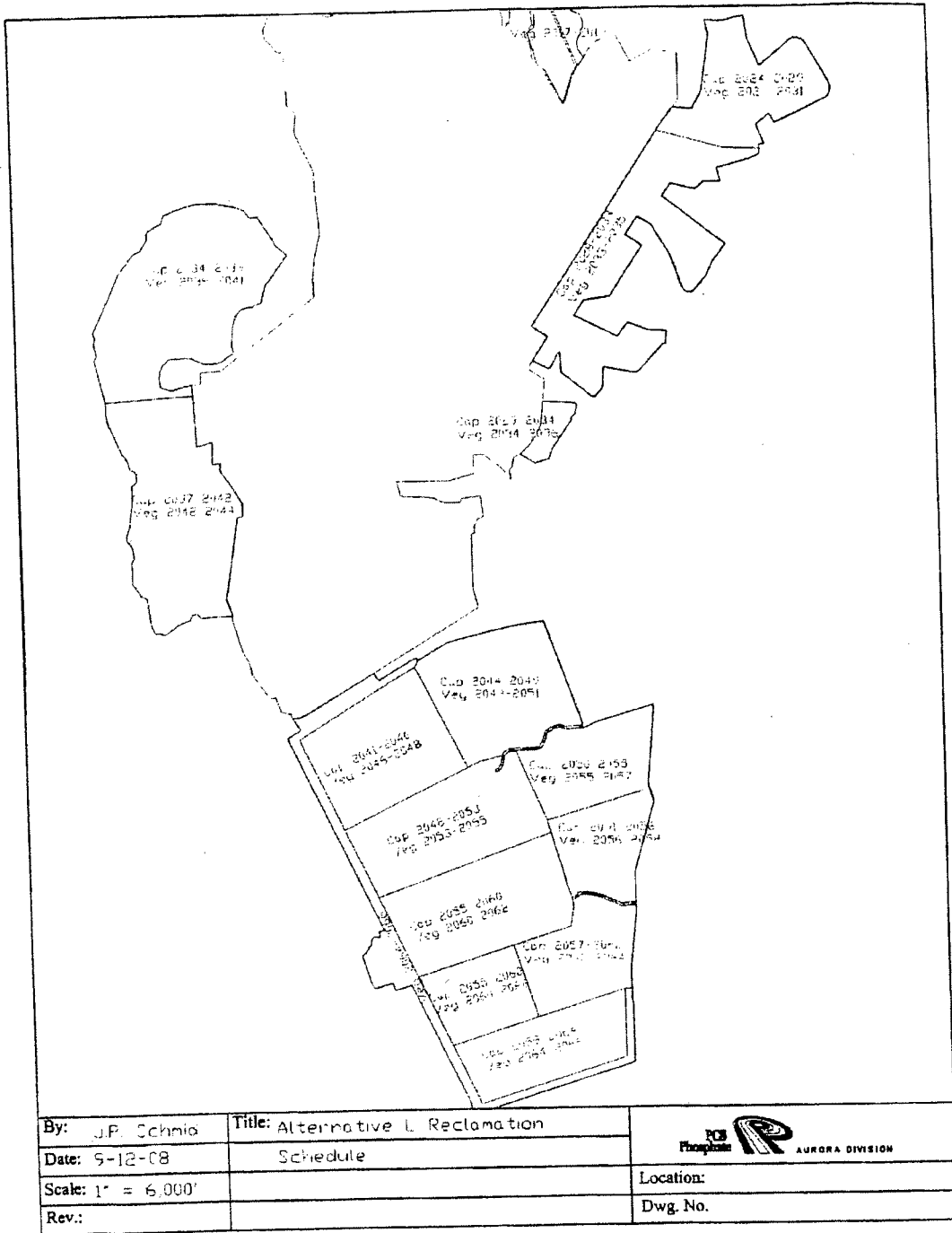


Figure 3. Depicts projected timeframes for completion of reclamation activities.

Action ID: 200110096  
Permittee: Potash Corporation of Saskatchewan Phosphate Division, Aurora Operation  
Location: Aurora, Beaufort County, North Carolina  
Date: June 3, 2009

## **RECORD OF DECISION**

### **1. Introduction**

The Potash Corporation of Saskatchewan Phosphate Division, Aurora Operation (PCS) has applied for Department of the Army authorization to undertake an approximately 11,343 acre mine advance into the approximately 15,100 acre project area surrounding its current mining operation located north of Aurora, Beaufort County, North Carolina. Provided below are my findings and decision regarding this application.

On November 2, 2000, PCS applied for Department of the Army authorization to continue its phosphate mining operation on the Hickory Point peninsula adjacent the Pamlico River and South Creek, north of Aurora, Beaufort County, North Carolina, once reserves are depleted under the existing permitted area. In response to public and agency comments on this original application, PCS elected to further reduce proposed impacts to waters of the US and on August 13, 2001, submitted a revised permit application. After a substantial review process including multiple public notices, publication of a Draft Environmental Impact Statement (DEIS), and a Supplement to the DEIS (SDEIS), extensive public and agency comment, a Public Hearing and multiple meetings of an interdisciplinary Review Team, PCS revised its application to request authorization of Alternative L, the project now being considered. The Final Environmental Impact Statement (FEIS) identifying Alternative L as the Applicant's proposal was published on May 23, 2008.

As the District Engineer for the Wilmington District, US Army Corps of Engineers, it is my decision that the proposed project should proceed as modified by the attached special conditions (Attachment 1). This decision is based on the Final Environmental Impact Statement for the PCS Phosphate Mine Continuation, Aurora, North Carolina dated May 2008 (FEIS), the District's files on this matter, the Public Interest Review, and my 404(b)(1) Guidelines analysis. I find Alternative L, PCS's proposed plan, as modified by additional avoidance and minimization of wetlands and streams and special conditions discussed below, to be acceptable in light of my analysis of the available alternatives in relation to applicable factors including engineering, economics, social criteria and the environment. These findings were made prior to and support my decision to issue Department of the Army authorization pursuant to Section 404 of the Clean Water Act for the proposed project identified as Alternative L, modified to minimize impacts to waters and wetlands, as described more fully below.

## **2. Description of the Applicant's Proposed Project**

The Applicant's proposed project, identified herein and in the FEIS as Alternative L, would allow PCS to continue its open pit phosphate mining operation into a portion of the approximately 15,100 acre project area. As presented in the FEIS, Alternative L included an approximately 11,909 acre mine boundary located to the east, west and south of the existing facility adjacent the Pamlico River, South Creek and Durham Creek, near Aurora in Beaufort County, North Carolina, allowing recovery of approximately 183,846,000 metric tons of the phosphate concentrate. Alternative L as presented in the FEIS included impacts to 4,140 acres of Waters of the US (4,135 acres within the mining footprint and an additional 5 acres associated with the relocation of NC Highway 306), over an approximately 37 year period.

Following release of the FEIS, impacts associated with Alternative L have been further minimized. The NC Division of Water Quality worked with the applicant to further minimize impacts to State designated Significant Natural Heritage Areas. Additional minimization efforts have focused on further avoidance of bottomland hardwoods and surrounding areas as suggested by National Marine Fisheries Service (NMFS) to further protect and buffer tributaries originating in the project area including designated Inland Primary Nursery Areas (PNA). Finally, the applicant has worked with the Corps and Federal Resource Agencies to minimize impacts to riparian areas buffering tributaries of South Creek.

The current Alternative L boundary (Modified Alternative L) would allow mining and mine related activities within an 11,343 acre area of the 15,100 acre project area. This boundary would produce approximately 172,473,000 metric tons of phosphate concentrate over a period of approximately 35 years. Modified Alternative L will result in the loss of 3,927 acres of waters of the United States (3,922 acres within the mining boundary and an additional 5 acres associated with the relocation of NC Highway 306) including 3,909 acres of wetlands. Modified Alternative L would also result in the loss of 18 acres of open water including 11 acres of pond, 10,332 linear feet of perennial stream and 12,103 linear feet of intermittent stream. The project will result in the loss of 3,448 acres of prime farmland in cultivation and will result in direct impacts to 47.87 acres of buffers regulated by the North Carolina Division of Water quality under the Tar/Pamlico River Buffer Rules. The mine project will not result in direct impacts to areas regulated by the North Carolina Division of Coastal Management as Areas of Environmental Concern pursuant to the Coastal Area Management Act. A detailed discussion of impacts associated with Alternative L is provided in the FEIS.

PCS is currently mining a 4,903 acre area adjacent the proposed project, including 1,286 acres of waters of the US, pursuant to a Department of the Army Clean Water Act permit issued on August 16, 1997 (1997 CWA permit). This previous authorization is thoroughly described in the Corps' Final Environmental Impact Statement for the Texasgulf Inc. Mine Continuation, Aurora, North Carolina dated August 1996.

### **3. Purpose and Need**

#### **a. Applicant's Purpose and Need**

The Purpose and Need for the proposed action is to continue mining its [the applicant's] phosphate reserve in an economically viable fashion. More specifically, the applicant's purpose and need is to implement a long-term systematic and cost-effective mine advance within the project area for the ongoing PCS mine operation at Aurora, North Carolina. The basic purpose of this project is to mine phosphate. Although much of the nation's phosphate deposits are located beneath wetland areas, the Corps has determined that this activity is not water dependant. Therefore, less environmentally damaging alternatives, including no action (no permit) alternatives have been studied.

#### **b. The Public Need**

The public need for phosphate rock is evident. Phosphate rock minerals are the only significant global commercial sources of elemental phosphorus. The agricultural sector is the largest user of phosphorus in the form of both fertilizer and animal feed supplements. Phosphate rock is also processed for use in consumer products such as soft drinks, toothpaste, foods, and flavors. Global demands for phosphate based products will likely increase because population growth, especially in developing nations, will necessitate greater food production in the years to come. The national and international reliance on phosphate rock and phosphate based products is discussed further in the FEIS.

PCS is a large and long-standing socio-economic force in Beaufort and surrounding eastern North Carolina counties. If allowed to continue mining operations, this facility will continue to provide much needed jobs, tax dollars, and donations to the local economy and the state of North Carolina. At the close of 2007 PCS Phosphate Aurora permanently employed approximately 600 direct employees and several hundred contractors working in the mine and mill operations of the Beaufort County facility. It has been estimated that for every one job at PCS, another 2.5 jobs are created in service and supply industries across the state.

PCS Phosphate is an important part of both the local and statewide economy. A 2006 study titled "PCS Phosphate Economic Impact" prepared by Dr. James W. Kleckley, Director of the Bureau of Business Research at the East Carolina University College of Business, contained the following facts. PCS is the largest private employer in Beaufort County, and one of the largest private employers in the region. PCS outputs over \$64 million in direct payroll per year with approximately 40% going to employees in the mine and mill operation. The average annual wage for PCS Phosphate in 2005 was \$62,160, a level that was much higher than the average wage for the County, the employment region, or the State.

Through payroll activities, local purchasing, and taxes, the total economic impact that PCS Phosphate's mine and mill facility has on the state of North Carolina is about \$400 million annually. PCS is Beaufort County's largest taxpayer. Based on the economic activity generated throughout the state, North Carolina's annual tax impact from PCS Phosphate is well over \$70 million with approximately forty percent attributed to the mining area. One way in which this is



achieved is through local purchasing. In 2007 almost 69% of PCS's purchases were made within the state of North Carolina, contributing about \$150 million dollars to the statewide economy. Approximately 50% (\$75 million) of this can be attributed to the mine and milling facility.

#### **4. Public Coordination**

In compliance with my responsibility under the National Environmental Policy Act (NEPA) of 1969, I determined that the issuance of Department of the Army Authorization under Section 404 of the Clean Water Act for the originally proposed mine continuation (Alternative AP) would constitute a major Federal action significantly affecting the quality of the human environment. Therefore, I have prepared an FEIS in accordance with the requirements of NEPA (40 CFR Parts 1500 – 1508) and USACE regulations (33 CFR Part 325, Appendix B). Alternative L is discussed in detail in the SDEIS and FEIS.

In response to the original November 2, 2000 application, the Corps circulated a Public Notice describing the proposed project on January 2, 2001 (Action ID No. 200110096), and held a public scoping meeting on February 28, 2001 to identify significant issues to be considered and evaluated prior to making a decision on the proposal. In addition to the public scoping meeting and other requests for input from the public at large, the Corps formed a review team (Review Team) made up of PCS, CZR Incorporated, State and Federal review agencies and interested environmental advocacy groups. The purpose of the Review Team was to provide a forum to allow each member to provide input to identify the major issues to be addressed, and potential alternatives to be explored.

In response to comments on the January, 2, 2001 Public Notice, PCS elected to revise its application by removing proposed impacts to approximately 49 acres of open water from its mining plan. The Corps circulated a second Public Notice on October 4, 2001, describing the revised application.

##### **a. Draft Environmental Impact Statement**

After extensive study, review of public comments, and coordination with the members of the Review Team, the Corps prepared and filed a draft Environmental Impact Statement (DEIS) with the U.S. Environmental Protection Agency (EPA) and released the document via Federal Register Notice on October 20, 2006. The Corps simultaneously issued a public notice requesting comments on the proposed project, on the DEIS and on the various alternatives described in that document. The original 3 month comment period was extended 2 weeks at the request of various commenters. The DEIS identified and evaluated 9 alternative mining alignments within the 15,100 acre project area. Several additional alternatives, including a "no action" alternative boundary, were identified, considered and eventually eliminated from detailed study. The Corps held a public hearing on the proposed project and the DEIS on December 14, 2006.

## **b. Supplement to the Draft Environmental Impact Statement**

Following review of the comments received and further discussion with review agencies and PCS, the Corps determined it was appropriate to evaluate an additional alternative, which became known as Alternative L. PCS requested a second additional alternative, Alternative M, be evaluated as well. Both Alternatives L and M are within the project area established in the DEIS. These two additional alternatives were presented in Supplement I to the DEIS (SDEIS) submitted to the EPA and released by Federal Register Notice in November 2007. Information necessary to evaluate both alternatives and to compare these alternatives to the alternatives introduced in the DEIS was contained in the SDEIS. The comment period for the SDEIS was originally 45 days, extended an additional 10 days at the request of commenters.

## **c. Final Environmental Impact Statement**

The Corps filed the Final Environmental Impact Statement for the PCS Phosphate Mine Continuation, Aurora, North Carolina (FEIS) with the EPA and released the document via Federal Register Notice on May 23, 2008. The Corps simultaneously issued a public notice requesting comment on the proposed activity, the alternatives and the FEIS.

Section 2 of the FEIS describes in detail the development of alternatives and identifies a full range of alternatives for the proposed project. Section 3 describes the existing conditions in the project area and Section 4 thoroughly discusses the potential impacts of each alternative. I have determined that all NEPA requirements for the consideration of DA authorization of modified Alternative L have been satisfied

## **5. Alternatives considered**

The 15,100 acre project area contains approximately 262 million tons of recoverable ore. The Corps thoroughly evaluated a number of alternatives during the EIS process, all of which are located within this project area. The project area consists of three separate tracts; the NCPC Tract (3,608 acres), the Bonnerton Tract (2,806 acres) and the S33 Tract (8,686 acres). Two alternatives, (AP and S33AP), are limited to a single tract within the project area, the NCPC Tract and S33 Tract, respectively. The remaining alternatives (the holistic alternatives), consist of two elements, a physical boundary including all three tracts, and a mining sequence among the three tracts within the project area. The Corps fully evaluated 9 action alternatives in the DEIS, and an additional 2 alternatives in the SDEIS. The FEIS addressed all 11 alternatives. Section 2.5.1 of the FEIS lists and describes the 11 action alternatives studied in detail. Table 1 provides impact information for each alternative.

### **a. Single Tract Alternatives**

#### **(1) AP Alternative**

The applicant's original preferred plan, the **AP Alternative**, was to continue the current mine advance on the Hickory Point peninsula into an approximately 3,412 acre area of the NCPC Tract. This alternative would provide approximately 15 years of mining and would impact 2,408 acres of waters of the US including 38,558 linear feet of stream, 2,377 acres of wetlands and 20

acres of open water ponds. Mining this alternative would impact 94<sup>1</sup> percent of the total acres of waters of the US within the NCPC Tract.

(2) S33AP Alternative. The **S33AP Alternative** is the other single tract alternative, and consists of mining the applicant's preferred alignment within the S33 Tract only. It would provide approximately 25 years of mining and impact 1,130 acres of waters of the US including 33,486 linear feet of stream and 1,123 acres of wetlands. Mining this alternative would impact 66 percent of the total acres of waters of the US within the S33 Tract. The Corps concurs with EPA that of the action alternatives, the S33AP alternative is the Environmentally Preferred Alternative.

#### b. Holistic Alternatives

Based on early scoping comments and coordination with the review team, the Corps determined it appropriate to expand the scope of its review to include holistic mine plan alternatives for the entire project area. The rationale for this determination is thoroughly explained in Section 2.4 of the FEIS. PCS has indicated its intention to mine the entire project if suitable market conditions exist, therefore, the Corps determined it was reasonable to consider mining of the entire project area in this permit application, allowing the evaluation of all impacts, as well as mitigation for those impacts, before making a permit decision.

##### (1) EAPA/EAPB Alternatives

Once the decision was made to expand the scope to include holistic alternatives, PCS submitted its preferred mining alignment for the entire project area. The **EAPA and EAPB Alternatives** consist of mining this alignment in Sequence A (NCPC to Bonnerton to S33) and Sequence B (NCPC to S33 to Bonnerton). These alternatives would provide approximately 49 years of mining and impact 5,668 acres of waters of the US including 89,150 linear feet of stream, 5,623 acres of wetlands and 20 acres of open ponds. Mining these alternatives would impact 89 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, these alternatives would allow the recovery of approximately 244,000,000 tons, or a 93% recovery of the ore in the area.

##### (2) DL1B Alternative

The **DL1B Alternative** was designed to provide the minimum area for a reasonable 1-dragline mine corridor on the NCPC tract. PCS currently must operate three draglines concurrently to meet production needs. Therefore this alternative requires separate and simultaneous mining operations with two draglines in the S33 Tract within the SCR boundary. Once allowable mining is completed in the NCPC and S33 Tracts under this alternative, the operation would progress to the Bonnerton Tract. This alternative would provide approximately 27 years of mining and would impact 2,285 acres of water of the US including 13,845 linear feet of stream,

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<sup>1</sup> The project area includes approximately 87 acres of Coastal Marsh and 49 acres of Public Trust Waters which some have argued could not be mined under State law. Although this matter has never been conclusively settled, the 136 acres have been removed for the purpose of the percentage calculations cited here.

2,281 acres of wetlands and 2 acres of open ponds. Mining this alternative would impact approximately 36 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, this alternative would allow the recovery of approximately 135,000,000 tons, or a 51% recovery of the ore in the area.

### (3) SCRA/SCRB Alternatives

The Corps, after coordination with the review team and PCS, requested that PCS explore an alternative mining alignment designed to maximize avoidance of waterways, riparian corridors and relatively undisturbed expanses of aquatic resources that are more difficult to mitigate, such as bottomland hardwood forest and marshes. The **SCRA and SCRB Alternatives** are separate sequences for mining this alignment. These alternatives would provide approximately 32 years of mining and would impact 3,506 acres of waters of the US, including 14,360 linear feet of stream, 3,493 acres of wetlands and 12 acres of open ponds. Mining either of these alternatives would impact 56 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, these alternatives would allow the recovery of approximately 160,000,000 tons, or 61% of the ore in the area.

### (4) SJAA/SJAB Alternatives

At the request of the North Carolina Division of Water Quality (NCDWQ) PCS explored a mining alignment within the project area that would avoid essentially all streams and buffers under the jurisdiction of the NCDWQ and all Coastal Area Management Act (CAMA) Areas of Environmental Concern under the jurisdiction of the North Carolina Division of Coastal Management (NCDQM). The **SJAA and SJAB Alternatives** are separate sequences for mining this alignment. These alternatives would provide approximately 38 years of mining and would impact 5,030 acres of waters of the US, including 2,508 linear feet of stream, 5,014 acres of wetlands and 15 acres of open ponds. Mining either of these alternatives would impact 81 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, these alternatives would allow the recovery of approximately 190,000,000 tons, or 73% recovery of the ore in the area.

### (5) Alternative L

**Alternative L** is a mining alignment designed to minimize impacts to those aquatic resources identified by the members of the Review Team as providing important functions supporting the Albemarle-Pamlico Sound Estuary, while allowing PCS approximately 15 years of mining within the NCPC and Bonnerton Tracts combined. As presented in the FEIS, this alternative provided approximately 37 years of mining within the project area and resulted in impacts to 4,140 acres of waters of the US including 29,288 linear feet of stream, 4,120 acres of wetlands and 12 acres of ponds. By letter dated April 24, 2008 PCS revised its application to request authorization of this alternative.

The Corps, NCDWQ and the Federal agencies have worked with PCS to further minimize impacts associated with Alternative L. The mining alignment for Modified Alternative L is depicted in Figures 1 A-C. Modified Alternative L would provide approximately 14 years of

mining within the NCPC and Bonnerton Tracts combined, and approximately 35-36 years of mining within the entire project area. Modified Alternative L would provide for mining of 11,343 acres of the 15,100 acre project area and would impact 3,927 acres of waters of the US including 22,435 linear feet (approximately 7 acres) of stream, 11 acres of open water pond and 3,909 acres of wetlands. This includes 5 acres of wetland that will be impacted as a result of a highway relocation necessitated by the mine advance. Mining this alternative would impact 62 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, this alternative would allow the recovery of approximately 172,473,000 tons, or 66% recovery of the ore in the area.

#### (6) Alternative M

**Alternative M** was developed by PCS. According to PCS the intent of this alternative is to minimize impacts to the NCPC Tract drainage basins and the tributaries of South Creek, while providing a holistic boundary that serves the applicant's purpose and need. This alternative would provide approximately 41 years of mining and impact 4,592 acres of waters of the US including 36,990 linear feet of stream, 4,569 acres of wetlands and 13 acres of ponds. Mining this alternative would impact 72 percent of the total area of waters of the US within the project area. Of the 262,000,000 tons of recoverable ore within the project area, this alternative would allow the recovery of approximately 204,000,000 tons, or 78% recovery of the ore in the area.

#### c. No Action Alternative

The **No Action Alternative** consists of 12 years of mining and would have no impacts to waters of the US. This alternative is located entirely within the S33 Tract because there is not sufficient non-jurisdictional area within either of the other tracts to develop a logistically reasonable mine plan. The Corps found that this No Action Alternative is not economically feasible in Section 2.7.4 of the DEIS.

#### d. Mine Discontinuation/Importation of Phosphate Rock Alternatives

Other no action alternatives including **Mine Discontinuation and Importation of Phosphate Rock** were explored and eliminated from detailed study, as were other alignments and mining sequences. Different mining methods were also considered and eliminated from detailed study. These alternatives and the reasons for their elimination from study are discussed in Section 2.6 of the FEIS.

### 6. Impacts of the Proposed Action

Section 4 of the FEIS provides a full discussion of the environmental impacts associated with the proposed project. Many of the environmental concerns expressed in comments on the FEIS and proposed project focus on; 1) the direct effects and overall scale of the impact to wetlands and other waters, and the effects of the loss of upland and wetland watershed on the surrounding waters 2) potential effects to surface and groundwater quantity and quality, 3) potential for heavy metal, particularly cadmium, contamination and 4) direct and indirect effects on fish and wildlife communities.

Late in this review process, an area of wetland hardwood forest within the Bonnerton Tract was characterized by the North Carolina Natural Heritage Program as a Significant Natural Heritage Area of national importance. This area has become an issue of interest and is further discussed below.

**a. Wetlands, Open Waters, Watersheds and the Surrounding Estuary**

Wetlands perform many important functions, including surface water storage, groundwater discharge and recharge, nutrient accumulation and cycling, organic matter production and export, capture of sediment and other pollutants, and wildlife refuge and habitat. The types of wetland communities within the project area, the functions they perform and the potential impacts that would occur to these as a result of this project, are thoroughly described in Sections 3 and 4 of the FEIS.

All of the locational alternatives, including Modified Alternative L, are within the 15,100 acre project area. The project area contains 6,380 acres of wetlands and open waters, and 115,843 linear feet of streams. The alternatives presented represent varying degrees of impact to those waters of the US, ranging from 0 to nearly 100% of the streams and wetlands found in the project area.

Modified Alternative L would allow mining and mine related activities to occur within approximately 11,343 acres. The project will impact 3,927 acres of waters of the US, including 22,435 linear feet of streams tributary and subtributary to the Pamlico River, 3,909 acres of wetlands and 11 acres of ponds. The open water, wetland and upland communities within the project area, and within Modified Alternative L, are thoroughly described in Sections 3.8 and 3.9 of the FEIS. As described in Section 3.8 of the FEIS, various community types found within the project areas were mapped as "Biotic Communities". The review team identified the bottomland hardwood forest as a community type that should be a primary focus in minimization efforts. As a result, bottomland hardwood forests represent only a small percentage of the project's total impacts. The wetland communities to be impacted consist of 63 acres of bottomland hardwood forest, 939 acres of hardwood forest, 879 acres of mixed pine-hardwood forest, 349 acres of pine forest, 264 acres of pocosin bay forest, and 22 acres of sand ridge forest. More altered wetland communities include 329 acres of herbaceous assemblage, 435 acres of shrub-scrub assemblage, and 624 acres of pine plantation.

Within the NCPC tract, mining Modified Alternative L would result in the loss of intermittent headwater sections of Tooley, Drinkwater, Jacobs and Jacks Creeks; Huddles Cut; Huddy Gut, 1 unnamed tributary to the Pamlico River (Identified as UP1) and 4 unnamed tributaries to South Creek (Identified as UTs 2, 3, 4 and 5). Direct stream impacts within the NCPC Tract would total 3,981 linear feet of intermittent headwaters. An approximately 220 linear foot section of PCS's main depressurization water outfall canal will be relocated as part of the NC Highway 306 realignment. Within the Bonnerton tract, mining Modified Alternative L would result in the loss of 2,533 linear feet of perennial and 4,786 linear feet of intermittent tributaries to Porter and Durham Creeks. Within the S33 Tract, mining under Modified Alternative L would result in the loss of headwater portions of Bailey Creek, Broomfield Swamp and Cypress Run totaling 7,799

linear feet of perennial stream and 3,336 linear feet of intermittent stream. These impacts are more thoroughly described in Section 4.2.2.6.7 of the FEIS.

Impacts to most of the less disturbed and/or higher quality wetlands have been avoided. Many of the wetlands that will be lost to this mine expansion are in extreme headwater and non-riparian landscape positions. Many are wet flats typically found on inter-stream divides and terraces. A large portion of the wetlands to be impacted by this project have been subject to agricultural and silvicultural activities over at least the last 6 decades, and many are currently being manipulated and maintained in an early to mid-successional condition through non-regulated land-use practices. The review team identified the bottomland hardwood forest as a community type that should be a primary focus in minimization efforts. As a result, bottomland hardwood forests represent only a small percentage of the project's total impacts (63 acres). All of the bottomland hardwood areas to be impacted by this project have been compromised by past ditching and channelization efforts. The NCPC Tract contains numerous named and unnamed tributaries to South Creek and the Pamlico River, all of which have been ditched and channelized in their upstream portions. Past agricultural, forestry and mining practices have altered the headwater stream valleys. None of the streams to be impacted within the NCPC Tract are perennial. An approximately 220 linear foot section of PCS's main depressurization water outfall canal will be relocated as part of the NC Highway 306 realignment. This canal has been determined a Water of the US and exhibits perennial flow but does not exhibit natural stream form or function. The Bonnerton Tract contains the headwaters of Porter Creek and several other unnamed small streams, most of which have also been ditched and channelized by past agricultural and silvicultural practices. S33 contains the headwaters of South Creek, Cypress Run and Broomfield Swamp all of which have been ditched and/or deeply channelized and are actively maintained as part of ongoing agricultural operations.

Direct impacts to uplands and wetlands under Modified Alternative L will result in short term reduction and permanent alteration to the watersheds of two named creeks that are direct tributaries to the Pamlico River. Huddles Cut will experience an approximately 75% reduction in existing watershed and Huddy Gut will experience an approximately 30% reduction in existing watershed. Additionally, a third, unnamed tributary to the Pamlico River (Identified as UP1) Pamlico River will experience an approximately 45% reduction in existing watershed.

There will also be short term loss and permanent alteration of the watersheds of two major tributaries of the lower Pamlico River, South and Durham Creeks, and their tributaries, as a result of direct impacts to uplands and wetlands under modified Alternative L. Approximately 18% of the South Creek watershed will be affected by mining and mine related activities (a total of approximately 23% of the estimated historic watershed when added to impacts of previous mining activity). This includes approximately 45% of the total watershed of 5 unnamed tributaries, approximately 36% of the current Tooley Creek watershed, approximately 51% of the current Drinkwater Creek watershed, approximately 41% of the current Jacobs Creek watershed, approximately 64% of the current Jacks Creek watershed, approximately 40% of the current Bailey Creek watershed, approximately 3% of the current Whitehurst Creek watershed, approximately 78% of the Broomfield Swamp watershed, and approximately 91% of the Cypress Run watershed. Approximately 7% of the Durham Creek watershed will be altered by mining and mine related activities (a total of 10% of the estimated historic watershed when added to

impacts of previous mining activity) including approximately 65% of the current Porter Creek watershed. Reclamation activities will eventually restore some watershed function to these impacted areas.

Several of these systems have experienced previous alteration in watershed as a result of past activities including agriculture, silviculture and mining. The estimated total cumulative watershed alteration for these creeks, when this action is combined with past actions, is as follows: approximately 84% of the estimated historic watershed of Huddles Cut, approximately 40% of the estimated historic watershed of Tooley Creek, approximately 60% of the estimated historic watershed of Drinkwater Creek, approximately 58% of the estimated historic watershed of Jacob Creek, approximately 84% of the estimated historic watershed of Jacks Creek, approximately 59% of the estimated historic watershed of Whitehurst Creek<sup>2</sup>, approximately 58% of the estimated historic watershed of Bailey Creek, and approximately 76% of the estimated historic watershed of Porter Creek.

It should be noted that the watershed percentages reported in the above 3 paragraphs differ from those reported in the FEIS for Alternative L. This is due in part to the further minimization efforts accomplished since release of the FEIS. This is also due in part to a further refinement of the drainage basin estimations. During the 404q elevation process, EPA and other agencies became more focused on the exact amount of drainage basin reduction. Calculating exact watershed for these creeks is difficult since there is little topography in this area, making it therefore difficult to determine exact breaks in surface flow. Determining overall reduction in watershed is further complicated by the fact that previous ditching activities have changed flow patterns, redirecting flow from the watershed of one creek to the watershed of another. This resulted in an increase in watershed size for some creeks. As more focus was placed on the amount of watershed alteration the Corps found it appropriate to attempt to better define the historic watersheds and estimate the change that has taken place from that original acreage.

It should also be recognized, that some of the acreage contributing to the historic alteration in watershed consists of previously mined areas that have been or are actively being reclaimed as required by State of North Carolina mining regulations. The reclamation activity has returned some of this watershed area, albeit in a somewhat reduced functional state. The watershed reduction figures provided above include all areas previously mined, without any consideration of the reclamation efforts. Any permit I issue, and likely any mining permit issued by the State of North Carolina, will require that future mining areas are also reclaimed to a useful state that will contribute watershed functions to the surrounding waters.

Indirect impacts to surface waters resulting from watershed reduction may include local reductions in nutrient input and cycling capabilities and reduction in the quantity and quality of water introduced into the system by both surface runoff and shallow groundwater. Possible impacts include potential changes in water chemistry and water quality, including alterations in salinity dynamics, increases in turbidity and changes and reductions in both dissolved and particulate organic matter inputs. These alterations could lead to at least local decreases in productivity and habitat value, and degradation of Essential Fish Habitat (EFH) and Habitat

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<sup>2</sup> It should be noted that approximately 113 acres of the Whitehurst Creek watershed has been restored to pre-mining contours and successfully revegetated with native species.



Areas of Particular Concern (HAPC) including nursery areas. The potential scale, severity and results of direct and potential indirect impacts to wetlands, watersheds, and the surrounding estuary are discussed in detail in Sections 4.2.1 and 4.2.2 of the FEIS.

The impacted tributary creeks are part of the larger South and Durham Creek systems, which in turn flow into the Pamlico River and the extensive Albemarle/Pamlico Estuary. The water quality benefits of the impacted areas to some degree affect the overall water quality of the larger systems into which they flow, It is not likely, however, that changes in water quality within these impacted tributary creeks will result in unacceptable adverse effects in their receiving waters, because of the relatively small size of these impacted waterways, and the overarching influences of the Pamlico-Tar River discharge, and the wind-tide driven Albemarle/Pamlico estuarine system.

The compensatory mitigation, performed within the same watershed, will offset many of the adverse effects by replacing many lost functions to the receiving waters of South Creek and the Pamlico River, including cycling and sequestration of nutrients, retention of floodwaters, and overall filtration of surface water input. The locations of the mitigation sites are shown on figure 7, Appendix, I of the FEIS. Additionally, the Corps, in consultation with State and Federal resource agencies and the Permittee has developed a monitoring and assessment program designed to ensure that any unexpected adverse effects to the aquatic system are identified and all practicable measures are undertaken to reduce such effects. The applicant has accepted this program and it will be incorporated as a special condition to any permit I issue.

#### Bonnerton Nonriverine Wet Hardwood Forest

The Environmental Protection Agency (EPA) advised the Corps by letter dated April 30, 2008 that approximately 272 acres of nonriverine wet hardwood forest within the center of the Bonnerton Tract was considered by the North Carolina Natural Heritage Program (NCNHP) as a Significant Natural Heritage Area (SNHA) of national importance. NCNHP classified the area as a nonriverine wet hardwood forest. The NCNHP describes these communities as wetland forests of poorly drained, mineral soils on broad interstream flats, which are "naturally dominated by some of the same trees as bottomland hardwood forests along large brownwater rivers." Widespread species such as white-tailed deer, black bear, gray squirrel and turkey are present in these areas, as are high densities and diversities of neotropical migrant birds such as wood thrush, ovenbird, Swainson's warbler, worm-eating warbler, prothonotary warbler, hooded warbler, white-breasted nuthatch, and the Coastal Plain black-throated green warbler. Nonriverine Wet Hardwood Forests are caused by seasonal high water tables and limited runoff of rainfall, due to flatness and natural absence of streams. Generally, no additional nutrients are brought in to these systems by flowing water, and aquatic animals cannot move in from the river during flooded times<sup>3</sup>. The Corps concurs that most of the area is a relatively mature, contiguous wetland system and exhibits most, if not all, of the characteristics described above. According to

<sup>3</sup> Schafale, Michael P., 2008, North Carolina Natural Heritage Program, "Nonriverine Wet Hardwood Forests in North Carolina, Status and Trends" North Carolina Natural Heritage Program Publication available at <http://www.ncnhp.org>

the description provided by NCNHP, however, this system has little communication with the other communities which comprise the surrounding aquatic ecosystem. The wildlife common to these areas are not unique to these areas, and are not dependent on wetlands or aquatic ecosystems<sup>4</sup>.

The entire Bonnerton Tract, including the nonriverine wet hardwood forest, has been a part of the project area since 2001. In 2005, the Corps, North Carolina Division of Water Quality (NCDWQ) and NCNHP personnel conducted a site visit to the project area, for the purpose of identifying any natural heritage areas. NCNHP submitted an assessment in 2005 discussing the Bonnerton area. The 2005 assessment classified approximately 203 acres of the Bonnerton Tract as a SNHA of State (rather than National) significance. The area identified at that time consisted of approximately 194 acres nonriverine wet hardwood forest, as described in Schafale and Weakley's "Classification of the Natural Communities of North Carolina Third Approximation" (Schafale and Weakley 1990), and approximately 9 acres of "secondary area." The NCNHP found the area to be of "excellent condition" and "one of the best remaining examples in the state" noting, however that the flood regime had been somewhat altered by ditching within and adjacent to the site.

NCNHP's January 2008 report on nonriverine wet hardwood forests listed 25 known sites within North Carolina and ranked the sites based on a combination of condition, size, and landscape context, with condition "primarily based on stand maturity and composition." Of these 25 sites, 3 ranked "excellent" 7 ranked a "very good" and the remainder ranked a "fair". The Bonnerton site, listed as 198 acres and the third largest site ranked, was considered "very good". The report noted that the almost exclusive range of nonriverine wet hardwood forests is northeastern North Carolina and southeastern Virginia.

It was unclear to the Corps why NCNHP changed the characterization of the site from "state significance" in 2005 to "national significance" in April 2008, and why the size increased from approximately 200 acres in both the 2005 assessment and the January, 2008 report to 272 acres in April 2008. In an attempt to understand the classification more fully, the Corps posed several questions to Mr. Schafale. Mr. Schafale responded by an August 26, 2008 e-mail, stating that the SNHA on the Bonnerton Tract is now comprised of the 198 acre nonriverine wet hardwood Forest and an additional approximately 73 acres comprised of a headwater stream on the face of the Suffolk Scarp to the west of the Bonnerton Tract, and other areas that are included as "connectors but aren't otherwise in good condition." Mr. Schafale explained that the listing of sites as either state or nationally significant is a product of the North Carolina Natural Heritage Program, and is vetted only internally within that program. There is no oversight by any outside agency or group, no rulemaking concerning how these sites are designated, and no public input into the designations. The listing "does not confer protection to a site, nor does it give sites regulatory status or indicate that they have regulatory status with any agency. "North Carolina Natural Heritage Program Biennial Protection Plan 2008," p. i. Mr. Schafale explained the elevation of the status of the Bonnerton site as resulting from the degradation of other known sites, and gave as examples sites logged in the 1980's and 1990's.

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<sup>4</sup> Hall, Stephen P. and Schafale, Michael P., 1999, "Conservation Assessment of the Southeast Coastal Plain of North Carolina, Using Site-Oriented and Landscape-Oriented Analyses", North Carolina Natural Heritage Program Publication available at <http://www.ncnhp.org>

Alternative L as presented in the FEIS avoided impacts to approximately 50 acres (approximately 25%) of the 198 acres of nonriverine wet hardwood forest within the 272 acre SNHA in the immediate riparian areas and headwaters of Porter Creek. On January 15, 2009, NCDWQ issued certification pursuant to Section 401 of the Clean Water Act that mining Alternative L would not violate State water quality standards provided several conditions were followed. One of these conditions required the avoidance of an additional approximately 124 acres of the SNHA. Modified Alternative L will avoid impacts to approximately 174 acres (approximately 64%) of this SNHA. The areas of this SNHA to be impacted under Modified Alternative L include mostly nonriverine wet hardwood forest area that has been more recently (previous 15- 20 years) impacted through normal silvicultural activities and areas of other community types that were added to the SNHA as connectors.

#### **b. Surface and Groundwater Quantity and Quality**

The proposed project also has the potential to impact surface water quality through the introduction of contaminants and/or sediments into adjacent waters. As discussed in Section 4.2.1.6 of the FEIS, mining activities are not expected to result in increased sedimentation within surrounding waters. As mining progresses, the first stage of mine development includes construction of perimeter canals and utility corridors. Prior to this construction, a silt ditch is constructed along the outside of the disturbance area. This silt ditch is not connected to any outlet and contains all sediment generated during construction activities. Additionally, these activities will require authorization through the NC Division of Land Resources (NCDLR) and it is anticipated that potential impacts will be further minimized through implementation of NCDLR requirements.

It is likely that the project will have some affect on the upstream reaches of creeks flowing from the project area. Based on available data from the site however, it does not appear that these affects will result in significant degradation of these waters. The 2008 end of year report for the NCPC Tract Stream Monitoring Program for PCS Phosphate Company, Inc.<sup>5</sup> assessed conditions within Huddles Gut, a tributary of the Pamlico River located at the north end of the NCPC Tract, both before and after mine related disturbance. During 2006, approximately 15% of the drainage basin for Huddles cut was effectively removed due to ongoing mine related activities. This report recognizes a post-disturbance reduction of flow in the upper reaches of the system on the stream portions affected, as well as differences in salinity. Other water quality parameters, including turbidity, dissolved oxygen, pH, ammonium, nitrate and Kjeldahl nitrogen, particulate nitrogen, orthophosphate, total dissolved and particulate phosphorus, chlorophyll *a*, and fluoride, exhibited little difference in pre- and post-disturbance trends and values.

The introduction of any other contaminants into surrounding watersheds will also be minimal. Once the perimeter canal system and utility corridors are constructed, all runoff from mining activities will be contained internally. The only input of water into the estuary as a result of the mining activities will occur with the discharge of groundwater removed from the aquifer during

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<sup>5</sup> CZR Incorporated, Skaggs, and Clough, 2009, "Post-Disturbance Year Two (2008) End of Year Report for the NCPC Tract Stream Monitoring Program for PCS Phosphate Company, Inc.", Prepared for PCS Phosphate Company, Inc., Environmental Affairs Department, Aurora, North Carolina.

the depressurization process into the Pamlico River proper. This discharge is authorized and monitored pursuant to an NPDES permit issued by the North Carolina Department of Environment and Natural Resources (NCDENR).

Section 4.1.2 of the FEIS describes the dewatering of the Castle Hayne aquifer as well as periodic dewatering of the shallow aquifer systems surrounding the mine facility. PCS currently holds a permit from the NCDENR to withdraw up to 78 mgd from the aquifers in association with the mine depressurization. Potential indirect effects to adjacent shallow groundwater quantity and quality are discussed in Section 4.2.1.4 of the FEIS. Study has indicated that the pumping of the aquifer has minimal to no effect on the perched water table surrounding the activity due to confining layers between the perched zone and the underlying aquifers. Therefore, the depressurization activities are not likely to affect the hydrology of neighboring surface waters or wetlands. Investigation of the groundwater within older reclaimed areas revealed that some areas exhibit elevated levels of arsenic (As), cadmium (Cd), copper (Cu), and Zinc (Zn) however, all were well below national primary and secondary drinking water standards. The Castle Hayne withdrawal creates a cone of depression with an approximately 20 mile radius. As discussed in Section 4.1.2.4 of the FEIS, study of vertical and lateral movement of groundwater into the cone of depression indicates that while contamination of the aquifer from brackish water intrusion is a remote possibility, it is highly unlikely

Finally, the NC Division of Water Quality has issued a Water Quality Certification pursuant to Section 401 of the Clean Water Act, finding that modified Alternative L will not result in a violation of applicable Water Quality Standards. The certification includes conditions requiring the monitoring of surface waters and groundwater. These conditions will be incorporated as conditions to any permit I issue.

#### **c. Cadmium Concentrations**

As thoroughly discussed in Section 4.1.3.1 of the FEIS, study indicates that the use of the gypsum-clay blend material in the reclamation process results in an above background level accumulation of the heavy metal cadmium (Cd) in soils of the reclaimed areas. Cadmium is a teratogen, a carcinogen and a possible mutagen, and is known to bioaccumulate.

In complying with conditions of the 1997 CWA permit, PCS worked with the Corps and other review agencies to investigate and mitigate for any potential effects of this cadmium accumulation. As a result of these efforts, PCS was required to cap reclamation sites with an average of 3 feet of clean soil. Recent compliance inspections have revealed that PCS has met or exceeded this requirement in all areas. Soil samples were taken in 2008 and are being analyzed to determine whether cadmium levels in the capped areas are similar to background soils for the region, as required by the 1997 CWA permit. PCS will be required to continue this effort in the reclamation of all mine areas authorized by this permit action, and the capped areas will be monitored to ensure efforts are successful in reducing the levels of cadmium available for uptake in the soil surface.

PCS has also conducted a study to determine whether cadmium has been introduced to surrounding areas outside of the mine and reclamation areas as a result of the mining and/or reclamation activity. Cadmium is a naturally occurring element in the surrounding land and waters, and can become enriched as a result of many human activities. All findings above expected background levels were either not attributable to PCS activity or were attributable to historic practices long discontinued. Section 4.1.3.1 contains a thorough description of this study.

#### **d. Fish and Wildlife Communities**

Authorization of Modified Alternative L will allow mining and mine related activities to occur within approximately 11,343 acres including 7,416 acres of uplands and 3,927 acres of wetland habitats. As discussed in sections 4.2.1.8, 4.2.1.9, and 4.2.1.11, this activity will result in the long-term alteration and, in some cases permanent loss of wetland and upland wildlife habitat. As further discussed in these sections, the mining activities will take place incrementally, allowing most mobile terrestrial and aquatic wildlife species to seek refuge in other areas as mining progresses. Additionally, reclamation efforts will result in reestablishment of terrestrial wildlife habitat in the mined areas. This incremental mine progression combined with reclamation efforts will also ensure that over time wildlife populations are not isolated by the work. Finally, the avoidance and minimization efforts incorporated into Modified Alternative L will result in the continued existence of unaltered upland and wetland buffer and wildlife corridors along the Pamlico River, South Creek, Durham Creek and their tributaries.

Under Modified Alternative L, direct impacts to much of the headwaters and riparian areas of the creeks originating in the project area, as well as all of the coastal marsh and open water nursery areas, are avoided. Of the four North Carolina Wildlife Resources Commission (NCWRC) designated inland Primary Nursery Areas (PNA) affected, approximately 15% of the Jacks Creek watershed, approximately 40% of the Jacobs Creek watershed, approximately 60% of the Tooley Creek watershed and approximately 25% of the Porter Creek watershed will remain intact. Regularly flooded, riparian wetlands such as those avoided typically provide high rates of organic carbon exports providing the base for many downstream food webs. Avoidance of these vegetated riparian areas will ensure that the project area creeks will continue to receive some level of dissolved and particulate carbon.

While loss of watershed area will likely have some localized effect on the tributaries originating in the project area, evidence indicates that the habitat value and nursery functions of these tributaries will not be lost. Section 4.2 of the FEIS thoroughly discusses the likely indirect effects of the project on surrounding wetlands and aquatic habitat, including nursery areas and EFH. As part of the ongoing NCPC Tract Stream Monitoring Program, the investigators sampled fish and benthic invertebrate populations within downstream portions of Huddles Cut pre- and post- watershed reduction and found no relationship between abundance, richness or community structure and drainage basin reduction (CZR, Skaggs and Clough, 2009). As referenced in Sections 3 and 4 of the FEIS, onsite research has indicated that relatively large watersheds are not essential to the recruitment and development of fishery species. Work

conducted in the project area<sup>6 7 8</sup> indicates that recruitment and development of post larval fisheries species such as spot (*Leiostomus xanthurus*), croaker (*Micropogonias undulates*) and Atlantic menhaden (*Brevoortia tyrannus*) as well as benthic invertebrate populations are similar within the natural creeks of the project area and PAII, a man-made system within the project area with less than 20 acres of watershed. An article in the September 2008 edition of the NCWRC's publication "Wildlife in North Carolina" reported that recent sampling revealed a "similar mixture of fresh and saltwater species" within the PNA creeks and PAII.

Sections 4.2.1.6 and 4.2.1.11.2 of the FEIS discuss the controlling influence the Pamlico River, Durham and South Creek have on their respective tributaries. South Creek has an approximately 49,700 acre watershed. Approximately 18% of this, will be affected by the proposed mining activities. Durham Creek has an approximately 37,500 acre watershed. Approximately 7% of this watershed will be affected by the proposed mining activity, primarily through impacts to the Porter Creek watershed. Otherwise, the Durham Creek watershed is relatively undisturbed and forested. Because of the relatively small percentage of watershed alteration, and the fact that Porter Creek empties essentially at the mouth of Durham Creek thereby limiting the influence to upstream areas, any impact to the estuarine functions of Durham Creek will be minimal.

Effects to the estuarine functions of the Pamlico River and greater Albemarle/Pamlico Sound Estuary as a result of this project should be minimal. The lower Pamlico River has an immediate watershed in excess of 800,000 acres; Modified Alternative L would impact less than 1% of this. While the Pamlico River and Sound do exert an influence on the salinity of the creeks within the project area as indicated by available data discussed in Sections 4.2.1.6, 4.2.1.11.2 of the FEIS, it is unlikely that the reduction of freshwater input in these tributary creeks will impact the salinity regime of the River or Sound. The contribution of nutrients including dissolved and particulate organic matter from the affected creeks may be decreased, however, this decrease should be adequately mitigated by the increase of inputs from the mitigation areas. Finally, the reduction of habitat value within the tributaries of the project area, particularly those PNAs, may result in a decrease in their contribution to fish and invertebrate population within the River and Sound. This decrease too should be adequately compensated for by the increased contribution made by creeks in and around the mitigation areas.

## **7. Proposed Compensatory Mitigation Plan**

On April 10, 2008, the Corps and EPA issued a new final rule entitled "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule," governing compensatory mitigation for activities authorized by DA permits. This new regulation provided that permit applications received prior to the effective date of the rule would be processed in accordance with previous

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<sup>6</sup> West, T.L., 1990, "Benthic Invertebrate Utilization of Man-Made and Natural Wetlands", Report to Texasgulf Chemicals, Inc. Aurora, NC.

<sup>7</sup> Rulifson, R.A., 1990, "Finfish Utilization of Man-Initiated and Adjacent Natural Creeks of South Creek Estuary, North Carolina, 1984-88", Report to Texasgulf Chemicals, Inc. Aurora, NC, Institute for Coastal and Marine Resource Technical Report No. 90-01.

<sup>8</sup> West, T.L., L.M. Clough and W.G. Ambrose Jr., 2000, "Assessment of Function in an Oligohaline Environment: Lessons Learned by Comparing Created and Natural Habitats", *Ecological Engineering* 15 (2000), pp 303-321.

compensatory mitigation guidance. Although this specific permit application predates the mitigation regulation, PCS voluntarily considered the new regulations in the development of its comprehensive mitigation plan.

The compensatory mitigation provided for this project is discussed in Section 4.3.2.3 of the FEIS and thoroughly described in Appendix I. Compensatory mitigation for wetlands, streams, and riparian buffers will be achieved through restoration of prior converted cropland to hardwood wetlands or pond pine-bay forest wetlands, restoration of hydrology and natural vegetation in wetland areas that have been drained or partially drained and are currently heavily managed pine plantation, restoration of hydrology to headwater stream and riparian systems, restoration of geomorphology and hydrology to degraded intermittent and perennial streams using principles of natural channel design appropriate for landscape position, enhancement of adjacent wetland areas either by replanting appropriate vegetation and/or manipulation of hydroperiods, restoration of riparian buffers in conjunction with stream mitigation and/or flexible buffer mitigation approaches and preservation of existing wetlands and/or streams by expansion of mitigation sites to include adjacent natural areas which may be threatened by development or degradation, or preservation of other valuable high quality wetlands. In total, the plan includes restoration of 7,968 acres of wetlands, 756 acres of wetland enhancement, and 2,472 acres of preservation. The plan also includes 44,043 linear feet of stream restoration, 7,994 linear feet of stream enhancement, and 32,851 linear feet of preservation. Table 2 provides total acreages and mitigation types by site.

PCS employed a team of biologists, stream ecologists, engineers, hydrogeologists, soils scientists, and compensatory mitigation practitioners to design a comprehensive mitigation package using a watershed based strategy. As suggested by USGS a larger scale, watershed focus will likely yield more successful and beneficial compensatory mitigation than locally focused projects<sup>9</sup>. The Corps and the NCDWQ worked with this group to develop a comprehensive mitigation package that includes the re-establishment, rehabilitation, enhancement of previously lost or degraded wetland areas within similar landscape positions as impacted areas as well as the preservation of similarly situated high quality wetlands. The mitigation will provide important hydrology, water quality and habitat functions to South Creek, Bath Creek, Pantego Creek, the Pungo River and the Bay River, most part of the lower Pamlico River watershed and all part of the greater Pamlico Sound estuary.

The Corps and the NCDWQ worked with PCS to develop a comprehensive mitigation package that includes the re-establishment, rehabilitation, enhancement of previously lost or degraded wetland areas within similar landscape positions as impacted areas as well as the preservation of similarly situated high quality wetlands. Several of the mitigation properties involve the restoration of entire watersheds, greatly increasing the potential for success. The mitigation will provide important hydrology, water quality and habitat functions to South Creek, Bath Creek,

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<sup>9</sup> Spruill, T.B., Harned, D.A., Ruhl, P.M., Eimers, J.L., McMahon, G., Smith, K.E., Galeone, D.R., and Woodside, M.D., 1998, Water Quality in the Albemarle-Pamlico Drainage Basin, North Carolina and Virginia, 1992-95: U.S. Geological Survey Circular 1157, on line at <URL: <http://water.usgs.gov/pubs/circ1157>>, updated May 11, 1998 .

Pantego Creek, the Pungo River and the Bay River, most of which are part of the lower Pamlico River watershed and all of which are part of the greater Pamlico Sound estuary. Successful mitigation will provide enhanced flood storage, nursery habitat, nutrient storage, input and cycling as well as improved overall water quality. These areas will also restore and enhance wildlife habitat, groundwater recharge and other functional values of wetland systems. Several of the mitigation properties are currently intensively farmed and/or logged and contain large portions or entire watersheds of named creeks that flow directly into fisheries nursery areas. For example, the Hell Swamp site contains the majority of the Scott Creek watershed and Scott Creek empties directly into Pungo Creek, a NCDMF designated Special Secondary Nursery Area.

The mitigation plan is comprised of 9 sites. PCS will provide compensatory mitigation in the form of restoration or restoration equivalents for all wetland impacts at a 2:1 ratio. Within the South Creek watershed, PCS will restore approximately 3,520 acres of wetland, enhance approximately 543 acres of wetland and preserve approximately 1,710 acres of wetland. PCS will restore approximately 885 acres of wetland, enhance 46 acres of wetlands and preserve 41 acres of wetlands in the watershed of Pungo Creek, which flows into the Pungo River, a tributary to the Pamlico River. PCS will restore 221 acres of wetland, enhance 38 acres of wetlands and preserve 20 acres of wetland within the upper watershed of 2 creeks tributary to Bath Creek which flows into the Pamlico River immediately across the River from the impact areas. Any remaining required mitigation will come from an approximately 4,200 acre site also located in the watershed of the Pungo River and made up of 3,342 acres of wetland restoration, 129 acres of wetland enhancement and 701 acres of wetland preservation.

The majority of the mitigation will be within the same 8-digit hydrologic unit code (HUC) as the project, HUC 03020104, which includes the Lower Pamlico River, South Creek and the Pungo River. A 603 acre mitigation tract is located within the 8-digit HUC immediately south of HUC 03020104. This tract consists of approximately 110 acres of wetland restoration, 162 acres of wetland enhancement and 196 acres of wetland preservation, as well as 3,960 linear feet of headwater stream preservation. This tract is contiguous with the Parker Farm, a 2000+ acre wetland restoration site located within HUC 03020104, a part of which was used as compensatory mitigation for PCS's 1997 CWA permit. Although this acreage is in an adjacent 8-digit HUC, it is considered appropriate compensation for the impacts of Modified Alternative L, because it is contiguous with forested wetlands adjacent to South Creek and will provide for an unbroken forested system of wildlife habitat and refuge. In addition, this tract is in the headwaters of Vandamere Creek, a tributary of the Neuse River. Both the Neuse and Pamlico Rivers are tributary to the Albemarle/Pamlico Sound Estuary. Surface waters are routinely exchanged between these sub-basins because of existing manmade drainage features in combination with area topography.

The comprehensive plan also includes mitigation to offset the loss of streams associated with Modified Alternative L. To compensate for the 10,332 linear feet of perennial stream and 12,103 linear feet of intermittent stream lost under Modified Alternative L, PCS will provide restoration or restoration equivalent (enhancement at a 2.5:1 ratio or preservation at a 5:1 ratio) stream mitigation at or above the maximum ratios recommended in the April 2003 Stream Mitigation Guidelines developed by the Wilmington District, USEPA, NCDWQ, and North Carolina



Wildlife Resources Commission. Many of the restoration projects are riparian headwater systems being constructed pursuant to the April 2007 paper titled "Information Regarding Stream Restoration with Emphasis on the Coastal Plain" prepared by the Wilmington District Corps of Engineers and the NCDWQ. All of the stream mitigation will be accomplished within wetland restoration or preservation sites.

All stream reaches impacted under Modified Alternative L are located in the upper headwaters of tributaries to the Pamlico River Estuary, as is the stream mitigation proposed by the applicant. Within the South Creek watershed, the applicant will restore approximately 3,000 linear feet of stream and preserve approximately 30,696 linear feet of stream. PCS will restore approximately 19,783 linear feet of stream at Hell Swamp, in the watershed of Pungo Creek, which flows into the Pungo River, a tributary to the Pamlico River. PCS will also restore 12,467 linear feet of stream and preserve 2,155 linear feet of stream within the upper watershed of 2 creeks that flow into Bath Creek, a tributary of the Pamlico River. Finally, PCS will restore approximately 8,793 linear feet of stream and enhance approximately 7,994 linear feet of stream in the watershed of Rutman Creek, also tributary to Pungo River. All of this work will occur within the same HUC as the project except for approximately 3,960 linear feet of preservation which will occur in the HUC to the south of the project area discussed above.

The broad suite of functions typically provided by all wetlands includes the maintenance of hydrologic features (surface and subsurface water storage), improvement and maintenance of water quality (sediment and pollutant retention, nutrient and pathogen transformation and removal), and wildlife habitat (food, cover and travel corridors). PCS's overall mitigation plan is designed to replace these wetland functions lost to the mining activities. If fully successful, the restoration and enhancement work will offset project impacts, and, in some cases result in higher functioning wetland systems than those impacted. Water that discharges into streams originating within these restored wetlands will be of much higher quality than what is currently discharging, unchecked, into the larger estuarine system via ditches and canals within the project area. Hydrologic and water quality improvements will be realized very quickly once ditches are plugged and the sites constructed.

The common wetland function that takes more time to replace is the habitat function provided by older plant communities. However, the temporal lag that exists between a newly planted mitigation site and a mature condition does not mean that the younger mitigation sites provide no habitat functions. Past mitigation work undertaken by PCS within similarly situated landscape positions clearly shows that animal species adapted to early successional sites will rapidly colonize the restored areas and as these sites mature, the array of species evolve toward those adapted to older wetland community types. At maturity, PCS's mitigation work will provide enhanced habitat functions over those wetlands lost to mining that are currently being kept in early successional stages and pine plantation monocultures via forestry practices. The fact that this mitigation work will be developed ahead of impacts also minimizes the effects of such temporal lag.

Execution of the mitigation plan will result in the restoration of higher functioning riparian wetlands in support of the Pamlico estuarine system. Currently, both the impact area wetlands and the restoration sites exhibit similar channelization and ditching features that have altered the

exchange of waters between waterways and their adjacent floodplains. This disconnection allows storm water to rapidly discharge directly into the river, carrying with it sediment and other pollutants. Several of the mitigation sites contain entire watersheds, including intermittent to second-order streams that will be buffered by restored riparian wetlands. These wetlands will stabilize the riparian zones, remove sediments and nutrients, provide organic input to the food web, store and attenuate flood waters, and provide valuable riparian habitat.

Additionally, many of the mitigation sites are currently in intensive agriculture and silviculture production. Removal of these areas from agricultural production will provide benefits to the overall Albemarle-Pamlico estuarine system. The Albemarle-Pamlico National Estuarine Program (APNEP) has identified agricultural runoff as a major source of nitrogen loading leading to algal blooms and eutrophication within the estuarine portion of the Albemarle-Pamlico system<sup>10</sup>. Based on USGS research within the Albemarle-Pamlico system, it is probable that conversion of these areas from agriculture to forested watershed will substantially reduce the nutrient load (Spruill et al 1998). The APNEP has also identified freshwater intrusion from increased runoff rates promoted by agricultural drainage practices as a potential harm to fisheries nursery areas. PCS's compensatory mitigation package includes removal of intense agricultural and silvicultural drainage and reestablishment of more natural drainage regimes within the headwaters of South Creek and Pungo Creek, both identified as Special Secondary Nursery Areas by the North Carolina Division of Marine Fisheries.

Execution of the mitigation plan will result in the restoration, enhancement or preservation of over 84,000 linear feet of high functioning streams and headwater systems within the same watershed as the project. Appropriate coastal plain stream morphology will be restored, reconnecting stream channels with their respective floodplains, thereby allowing the adjacent riparian wetland areas to cleanse the water. This represents a functional uplift in that most of the streams that will be impacted by this project are channelized and rapidly distribute their waters directly into South Creek and the lower Pamlico River, without the benefit of the flow attenuation and treatment functions wetlands provide.

This mitigation plan includes an approximately 10% overbuild of wetlands to be used as a contingency in the event some of the mitigation projects do not meet success criteria. PCS proposes to fully construct and preserve all sites as described in Appendix I, and subsequent Corps approved site specific mitigation plans. If all sites are 100% successful, the plan will deliver more wetland mitigation acreage than is necessary to compensate for the authorized impacts. PCS has requested that in that event, it be allowed to "bank" the excess mitigation for future use. I have agreed with that concept. If all mitigation is successful, a portion of Rutman Phase II and the entirety of Rutman Phase I will be excess mitigation. The success and value of the remainder of Rutman Phase II and all of Rutman Phase III is not dependant upon the existence or success of the remainder of the site. If all mitigation is successful, I will therefore allow PCS to hold a portion of Rutman Phase II and all of Rutman Phase I as potential mitigation for potential future impacts. Because of the interrelatedness of the streams and surrounding wetlands, all stream mitigation contained within the wetland mitigation areas applied, will be included as compensation for the authorized impacts. Stream areas within any portions of the Rutman Site to be banked, may also be banked.

<sup>10</sup> [http://h2o.enr.state.nc.us/nep/tarpamlico\\_river\\_basin.htm](http://h2o.enr.state.nc.us/nep/tarpamlico_river_basin.htm)

Any permit I issue will include special conditions requiring the approval of each site-specific plan before PCS may move forward with mining beyond specified areas. Any permit will also include conditions to ensure that sufficient compensatory mitigation has taken place prior to specific impacts occurring. In other words, all compensatory mitigation will be provided in advance of the impact for which they are mitigating.

**a. Specific Mitigation Sites**

(1) **South Creek Corridor Complex.** This 8,795 acre Complex includes all mitigation sites associated with this permit action, and the former permit action, preserved in perpetuity and located adjacent to and/or contiguous with South Creek and its headwaters. The Complex is an extensive wildlife corridor and diverse ecosystem of interconnected parcels of existing wetlands, restored, enhanced and preserved wetland and stream mitigation areas, and interspersed uplands linked to a riparian corridor along both sides of South Creek. The establishment of this expansive corridor beginning at its headwaters and progressing 8 miles downstream will greatly benefit South Creek and the Pamlico estuary, offsetting the unavoidable losses of the smaller systems impacted by the mining. The entire Complex has been previously impacted by agriculture and forestry activities, and remaining older tree communities are currently being methodically clear cut. Preservation of the mature systems within the Complex will offset the temporal lag of habitat functions at the younger mitigation sites and when coupled with the wetland restoration work, creates a very important wooded wetland corridor along the upper reaches of South Creek.

(a) **Bay City Farm.** Formerly Prior-Converted Cropland in intensive agricultural row-crop production, the 709-acre Bay City Farm headwater wetland and stream restoration project, located within the South Creek watershed upstream of the project area, has already been constructed and monitoring is underway. Early results indicate that more than 3,000 linear feet of headwater stream will likely be restored within a historic riparian headwater valley that flows directly into South Creek. Riparian and non-riparian indigenous wetland tree species have been planted on the site within appropriate hydrologic zones. Conversion of this agricultural land back to a wetland ecosystem immediately removed agricultural pesticides, herbicides, fertilizers and sediments from South Creek. Functional uplift over time will include water quality improvement through retention of sediments and other pollutants, nutrient retention and reduction, production and export of organic nutrients, surface water storage, increased groundwater recharge and/or discharge, wildlife habitat, and flood flow attenuation. Plugging of the agricultural ditches for purposes of restoration immediately decelerated the flow of storm water into South Creek. Portions of the Bay City Farm lie within the FEMA 100-year floodplain and the project will also attenuate floods during extreme events.

(b) **P Lands.** This area is currently in intensive loblolly pine forestry production. Mitigation work on this property will result in the re-establishment and rehabilitation of approximately 2,900 acres of non-riparian and riparian wetlands located within the headwaters of South Creek. The property has been ditched and much of it drained by forestry related activities, rendering the area a mosaic of former and highly stressed wetlands. The filling of the canals and ditches and subsequent conversion of the vegetation community

from a monoculture pine plantation to more appropriate riparian and non-riparian hardwood systems will benefit habitat value and water quality within South Creek, offsetting the losses resulting from the mining of the headwater areas on the NCPC and Bonnerton Tracts. Functional uplift as a result of this work includes increased surface and sub-surface water storage, reduction of runoff and flow velocity, increased production of organic matter, increased opportunity for groundwater recharge and/or discharge, and increased and improved wildlife habitat. Restoration of the P Lands will also decelerate the current rapid delivery of storm water to South Creek via the ditches and canals and result in the re-establishment of a very large, contiguous hardwood wetland ecosystem. The 2,900 acre P Lands tract is located in the headwaters of South Creek, and is an important component of the South Creek Corridor Complex as the 2,900 acre property is located in the headwaters of South Creek.

**(c) U Lands.** Immediately to the west of the P Lands, this 787 acre site is also located within the headwaters of South Creek and is currently in loblolly pine forestry production. The majority of the site is ditched and is currently being clear cut in phases by Weyerhaeuser. The property is divided into clear cut areas, regenerating clear cuts, and uncut forests. A non-riparian wet hardwood forest will be restored to a majority of the site by filling the drainage network, removing existing vegetation and replanting the site with appropriate wetland trees and shrubs. A large, regenerating wetland at the northeastern tip of the property will be included as preservation mitigation. Functional uplift through restoration of the U Lands will be the same as the P Lands with the biggest gains coming from the deceleration of the current rapid delivery of storm water to South Creek and the re-establishment of a large, contiguous hardwood wetland ecosystem.

**(d) Parker Farm Sections H, I and J.** The Parker Farm is located adjacent to the P Lands and just east of the Bay City Farm and Gum Run mitigation sites. The 603 acres of Sections H, I, and J are offered as mitigation for this permit. The tract is part of the 2,811-acre Parker Farm property restored as part of the compensatory mitigation plan for the previous permit. Although constructed as part of the Parker Farm, the 603 acres offered here were not part of the mitigation required for the previous permit. Long-term hydrology monitoring documents that 245 acres of non-riparian, wet hardwood flats have been restored in Section H and I, 162 acres of non-riparian wetlands enhancement exists within Section I, and 196 acres of wetland preservation exists in Section J (including the headwaters of Vandemere Creek containing bottomland hardwoods and brackish marsh). The cessation of intensive agricultural practices and plugging of ditches on the Parker Farm resulted in immediate and permanent water quality improvement through retention of sediment and other pollutants, nutrient retention and reduction, production and export of organic nutrients, surface water storage, increased groundwater recharge and/or discharge, wildlife habitat, and flood flow attenuation. Due to the age of the project, larger trees now exist on the site, lessening the effects of overall temporal lag on wildlife habitat. Most of the Parker Farm is located above the 100-year floodplain, although the lower portions of Section J closer to Vandemere Creek perform flood flow attenuation functions. The preserved headwaters along 3,960 feet of Vandemere Creek in Section J and the proximity of Sections H and I to both South Creek and Vandemere Creek, respectively, create multiple hydrologic links for organic matter production and export. The preservation of Section J will allow natural riparian buffer zones to continue to filter pollutants and protect water quality for the headwaters of Vandemere Creek. The Parker Farm

provides a wide and contiguous wildlife corridor connecting two river basins (Pamlico and Bay Rivers).

(e) **Gum Run Sites.** Formerly Prior-Converted Cropland in agricultural row-crop production, the Gum Run sites encompass 89 acres split among three separate tracts: a) Gum Run East (24 acres); b) Gum Run West (24 acres); and c) Gum Run 2 (41 acres). These properties are located immediately to the northeast of the Bay City Farm mitigation site and were developed by PCS in the early 1990's to demonstrate the feasibility of plugging ditches and restoring agricultural land back to non-riparian wet hardwood forest. The sites are located within the watershed of Gum Swamp Run, a tributary to South Creek. A diverse vegetative community has been established and Gum Run East and Gum Run 2 are dominated by hardwoods, while Gum Run West contains a mixed pine/hardwood community. Monitoring of these sites documents that 27 acres of non-riparian wooded wetlands have been restored and continued monitoring and analysis may reveal additional restored acreage is available. Restoration of this agricultural land to a forested community immediately and permanently removed agricultural pesticides, herbicides, fertilizers and sediments from the waters of Gum Swamp Run and South Creek. The project increased organic matter production, sediment capture, nutrient transformation and flood flow attenuation functions and the age of the project (16 years) lessens the effects of overall temporal lag on wildlife habitat. Many wildlife species, such as bear, deer, skunks, rabbits, snakes, and neo-tropical song birds have been documented on the sites over the years.

(f) **South Creek Corridor Preservation Parcels.** These parcels represent the primary preservation component of the larger South Creek Corridor Complex. The South Creek Corridor Preservation Parcels match the landscape and hydrogeomorphic conditions of the NCPC Tract. The terrestrial and aquatic functions provided by this natural corridor include flood storage, sediment removal, nutrient cycling and wildlife habitat. These preservation parcels are located upstream of the mine project area and encompass portions of three general landscape positions, a) lower floodplain; b) terraces; and c) non-riparian wetland flats. These areas have been and are still subject to logging practices. Preservation of these parcels and the cessation of logging activities within this corridor will augment the habitat and buffering functions of these wetlands in perpetuity.

(2) **Hell Swamp/Scott Creek.** Located across the Pamlico River and to the north of the mine area, this 1,306 acre site is currently a designated Prior-Converted Cropland in intensive agricultural row-crop production. The Hell Swamp project is an important component of the Applicant's comprehensive mitigation plan, encompassing the majority of the Scott Creek watershed that flows directly into Pungo Creek, a designated Special Secondary Nursery Area (SSNA). South Creek is also a designated SSNA and the Hell Swamp project, when coupled with the South Creek Corridor Complex, will directly benefit fisheries nursery areas that are a part of the greater Pamlico estuarine system. Scott Creek has been impacted by channelization and agricultural practices and is influenced by wind tides well up into the site. Approximately 19,480 linear feet of streams will be restored and enhanced on the site, including reconnection to historic floodplain and the restoration of several riparian headwater systems. Bottomland hardwood systems will be restored and enhanced along lower Scott Creek. Within the remainder of the site, headwater swamp forests and non-riverine wet hardwoods will be restored and

preserved. Additionally, over 100 acres of uplands will be restored via the plugging of farm ditches and the planting of appropriate upland species. This unique component of the overall mitigation plan will augment the functioning of the Hell Swamp restoration work and will provide diverse wildlife habitat in perpetuity. Preservation on this site includes approximately 35 acres of old-growth, non-riverine wet hardwood forest at the top of the Scott Creek watershed.

The restoration of this agricultural land to a forested community will immediately and permanently remove agricultural pesticides, herbicides, fertilizers and sediments from the waters of Scott Creek, Pungo Creek and ultimately, the Pungo River. Restoration of appropriate coastal plain stream features on the site will benefit fish and other aquatic species by increasing habitat, refuge and foraging areas for post larval fisheries species adjoining the Special Secondary Nursery Area. The restoration of this large, contiguous hardwood wetland ecosystem will also increase the surface and subsurface water storage capacity of the site and will decelerate the current rapid delivery of storm water and pollutants to Scott Creek and the fisheries nursery area waters of Pungo Creek. The restored headwater wetlands will provide a contiguous wildlife corridor between the preserved high quality non-riverine wetlands at the top of the watershed all the way down to the estuarine areas of lower Scott Creek. The variety of landscapes and hydrologic regimes on this site, including the restored upland areas, will provide important food and cover habitat for terrestrial and aquatic wildlife.

**(3) Upper Back Creek.** Formerly Prior-Converted Cropland in intensive agricultural row-crop production, this headwater wetland and stream restoration project, located across the Pamlico River and to the north of the mine area, is currently under construction. Upper Back Creek is a tributary to Bath Creek and ultimately the Pamlico River. This project includes restoration and preservation of riparian and non-riparian wooded wetlands directly abutting the headwaters of Upper Back Creek. The project also includes the restoration of the flooded headwater areas of Upper Back Creek and preservation of upper portions of existing Upper Back Creek. Conversion of this agricultural land back to a wetland community immediately and permanently removed agricultural pesticides, herbicides, fertilizers and sediments from the waters of Upper Back Creek and Bath Creek. Functional uplift over time will include water quality improvement through retention of sediments and other pollutants, nutrient retention and reduction, production and export of organic nutrients, surface water storage, increased groundwater recharge and/or discharge, wildlife habitat, and flood flow attenuation. This project will directly benefit Bath Creek, a major tributary of the Pamlico River, providing water quality and habitat improvements to the Pamlico estuarine system. The variety of landscapes and aquatic hydrologic regimes on this site will provide diverse cover and food opportunities for terrestrial and aquatic wildlife.

**(4) Sage Gut.** Located to the south of the Hell Swamp site, this 135 acre property is currently a designated Prior-Converted Cropland in intensive agricultural row-crop production. Sage Gut is a tributary to Jack Creek and Pungo Creek, a designated fisheries nursery area. This project includes restoration and preservation of stream and abutting riverine and non-riverine wetlands. Conversion of this agricultural land back to a forested wetland community will immediately and permanently remove agricultural pesticides, herbicides, fertilizers and sediments from the waters of Sage Gut, Jacks Creek and most importantly, Pungo

Creek. Functional uplift will include water quality improvement through retention of sediments and other pollutants, nutrient retention and reduction, production and export of organic nutrients, surface water storage, enhancement of wildlife habitat, and flood flow attenuation. Restoration of the Sage Gut site will also decelerate the current rapid delivery of storm water to Jacks and Pungo Creeks via the agricultural ditches.

(5) **Rutman Creek Watershed**. Located northeast of the Hell Swamp project and adjacent to the Pocosin Lakes National Wildlife Refuge and Ducks Unlimited restoration lands, this 4,303 acre property is currently a designated Prior-Converted Cropland in intensive agricultural, row-crop production. Like the Hell Swamp restoration project, Rutman Creek is a large wetland restoration site that encompasses the entire watershed of Rutman Creek, a second-order tributary of the Pungo River. Rutman Creek has been impacted by channelization and agricultural practices and the goal of this project is to restore the pocosin-bay forest habitat similar to that lost to mining. Conversion of this agricultural land back to a forested wetland community will immediately and permanently remove agricultural pesticides, herbicides, fertilizers and sediments from the waters of Rutman Creek and the upper Pungo River. Restoration of the Rutman property will also decelerate the current rapid delivery of storm water to the Pungo River via the ditches and canals. This project will re-establish a wildlife corridor connecting the refuge with the Pungo River.

## 8. **Other Required Coordination and Authorizations**

### a. **Cultural Resources**

As described in Section 4.2.2.16 of the FEIS, investigation of the entire 15,100 acre project area revealed no sites either listed or eligible for listing in the National Register of Historic Places. By letter dated July 27, 2006, the NC Department of Cultural Resources concurred with this finding and that no further cultural resource investigation was necessary. It is therefore my finding that the proposed alternative L will result in no effect to historic properties either listed or eligible for listing in the National Register of Historic Places pursuant to Section 106 of the National Historic Preservation Act.

### b. **Endangered Species**

Section 4.2.1.12 of the FEIS contains a thorough discussion of the Corps' position on federally listed species and their critical habitat protected under the Endangered Species Act of 1973. The Corps has determined that the proposed project will result in no effect to the red wolf (*Canis rufus*), the red-cockaded woodpecker (*Picoides borealis*), the Carolina gopher frog (*Rana capito capito*), the shortnose sturgeon (*Acipenser breviorstrum*), rough-leaved loosestrife (*Lysimachia asperulaefolia*) and sensitive joint-vetch (*Aeschynomene virginica*). In the FEIS, the Corps determined that due to a necessary bridge construction across an unnamed tributary of the Pamlico River, the proposed project may affect, but was not likely to adversely affect, the West Indian manatee (*Trichechus manatus*), Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*) and the green sea turtle (*Chelonia midas*). Since issuance of the FEIS, PCS revised its plan for bridge construction to eliminate all in-water structures. As

a result of this modification, I have revised my determination on these species to a no effect. This has been coordinated with the National Marine Fisheries Service (NMFS) and by e-mail dated September 29, 2009, NMFS concurred with this determination.

### **c. Essential Fish Habitat**

The Magnuson-Stevens Fishery Conservation Management Act established procedures for identifying Essential Fish Habitat (EFH) and required interagency coordination to further the conservation of federally managed fisheries. The Corps is required to consult with NMFS prior to authorizing any action that could adversely affect EFH.

In a February 8, 2007 comment letter on the DEIS, the National Marine Fisheries Service (NMFS) identified 151 acres within the AP Alternative on the NCPC Tract as Essential Fish Habitat (EFH) designated by the South Atlantic Fishery Management Council (SAFMC). These included 11 acres of estuarine tidal creeks and their associated SAV/freshwater aquatic beds (corresponding to community type 1, "Creeks/Open Waters" in the biotic community mapping described in Section 3.8 of the FEIS), 38 acres of estuarine/palustrine marsh (corresponding to community type 2, "Wetland Brackish Marsh Complex") and 102 acres of palustrine forested wetlands (Corresponding to community type 3 "Wetland Bottomland Hardwood Forest"). NMFS also expressed concern over the impacts to the remaining wetlands affected by the AP Alternative within the NCPC Tract, which it specifically referenced as "not EFH". Based on these concerns, NMFS included as an EFH Conservation Recommendation: "The Department of the Army shall not authorize mining activities within the NCPC Tract."

NMFS commented on the SDEIS by letter dated December 27, 2007, stating that "Both Alternative L and M would avoid direct impacts to 141 acres of EFH associated with South Creek and other tributaries in the NCPC Tract." NMFS expressed concern over the potential scale and severity of indirect impacts to EFH as a result of the loss of surrounding wetlands associated with Alternative L. Among other concerns, NMFS stated that activities associated with Alternative L would result in a reduction in the amount of organic detritus delivered to estuarine food chains from forested wetlands. Finally, NMFS concluded that PCS's proposed mitigation plan, as presented at the time, lacked sufficient detail to demonstrate that sufficient mitigation would be provided in a timely manner and suggested the establishment of mitigation trajectories with respect to mining schedules. Based on these concerns, NMFS included as an EFH Conservation Recommendation: "Mining activities within the NCPC and the Bonnerton tracts shall not be authorized. NMFS believes further discussion regarding the size for buffers for creek headwaters, compensatory mitigation plans, and the schedules for mitigation and reclamation would be fruitful."

On May 22, 2008 the Corps released the Final Environmental Impact Statement (FEIS) identifying Alternative L as the applicant's proposed project and preferred alternative. Section 3.11.3 of the FEIS presents information on the existing EFH and Habitat Areas of Particular Concern (HAPC) for managed species potentially occurring within and/or around the study area. Sections 4.2.1.6 and 4.2.1.11.2 discuss the potential impacts to EFH resulting from drainage basin reduction and metal concentration enrichment common to all alternatives and 4.2.2.11.3.7



along with Tables 4-24 and 4-25 present the potential direct and indirect impacts to EFH and HAPC under Alternative L.

By letter dated July 14, 2008, NMFS submitted comments on the FEIS and Alternative L. In this letter, NMFS stated that it remained "opposed to mining within the NCPC and Bonnerton Tract in the manner currently proposed". However, NMFS went on to state that should Alternative L as described in the FEIS be selected as the Least Environmentally Damaging Practicable Alternative, it would "provide an adequate framework for developing and evaluating site-specific impact-avoidance measures that will culminate in a permit decision." In general, NMFS expressed concern over identification of EFH, the need to minimize direct and indirect impacts, compensatory mitigation plan and compliance monitoring.

Among concerns identified by NMFS in the July 14, 2008 letter was the opinion that the FEIS was incorrect in stating that direct impacts to state designated Primary Nursery Area (PNA) were avoided under Alternative L. NMFS pointed out that upper limits of PNAs are not defined or delineated by the state and it is not possible to assess the aerial extent of a PNA without the establishment of this limit. NMFS stated that "Forested wetlands that surround or serve as headwaters for estuarine creeks are essential for the creeks to serve as PNAs and why the South Atlantic Fishery Management Council designates forested wetlands and PNAs as EFH."

The Corps holds that its statements in the FEIS are correct. North Carolina Wildlife Resources Commission (NCWRC) designated inland primary nursery areas within the project area include Tooley, Jacobs and Jacks Creeks within the NCPC Tract and Porter Creek within the Bonnerton Tract. Indeed, the upper limits of these PNAs have not been delineated in the field. However, North Carolina State Statute (15A NCAC 03I .0101) defines Nursery Area as "Those areas in which for reasons such as food, cover, bottom type, salinity, temperature and other factors, young finfish and crustaceans spend the major portion of their initial growing season." The statute further defines Primary Nursery Area as "Those areas in the estuarine system where initial post-larval development takes place. These are areas where populations are uniformly early juveniles." This definition seems to logically limit the PNA designation to those areas that are permanently or at-least regularly flooded. Direct impacts to the above mentioned creeks are limited to intermittent, extreme headwater areas which we do not believe meet the statutory definition of PNA. There will be impacts to forested wetlands surrounding these creeks, however, these impacts will be limited to those wetlands that are not flooded or, at most, are flooded only during extreme storm events. Again, we do not believe these areas meet the statutory definition of PNA.

NMFS commented that Alternative L does not avoid indirect impacts to EFH including PNAs. The Corps agrees with this statement. The potential indirect impacts to the PNAs and other surface waters within the project area are discussed throughout Section 4.2. It is likely that these areas will experience some alteration in salinity and in nutrient input and cycling as a result of watershed reduction. However, as discussed in Sections 4.2.1.6, 4.2.1.11.2, 4.2.2.11.2 and 4.2.2.11.3, existing data indicate that these reductions should be localized and should not result in a substantial loss of habitat value. NMFS and others have suggested that these indirect impacts could be further reduced by minimizing mining impacts within the forested wetlands adjacent these water bodies and increasing buffer areas.

Based on comments from NMFS and others, the Corps worked with PCS to further minimize impacts associated with Alternative L. Within the NPC Tract, the 3.79 acres of tidal palustrine forest EFH at the headwater of Huddy Gut was eliminated from the mine boundary and additional minimization was also accomplished in the headwaters of Tooley Creek, in the areas buffering Broomfield Swamp and Cypress Run in the S33 Tract and in the headwater area of Porter Creek in the Bonnerton Tract. In March 2009, the Corps notified NMFS pursuant to CWA Section 404(q) of our intention to issue a conditioned permit for a modified version of Alternative L that would have avoided 2,403 acres (38%) of the waters of the US within the project area. In a letter dated April 17, 2009 NMFS informed the Corps that it would not request higher level review of the permit action pursuant to CWA Section 404(q). In this correspondence, NMFS also included that as a result of the above referenced minimization efforts, "direct impacts to HAPCs are no longer likely".

While NMFS did not request elevation of the permit decision, NMFS staff did participate in further meetings aimed at minimizing project impacts. Further coordination occurred during which NMFS identified specific areas in which it believed further avoidance would be appropriate. After coordination with the Corps, NMFS, EPA, USFWS the applicant agreed to further minimization focused on the areas identified by NMFS. As a result of these efforts, an additional 52 acres of wetlands in the headwaters of Jacks, Jacobs, Tooley, Drinkwater and Porter Creeks, as well as Cypress Run, have been avoided. In total, wetland impacts have been further minimized by approximately 202 acres.

Under Modified Alternative L, direct impacts to many of the headwaters and riparian areas of creeks within the project area, including all coastal marsh, are avoided. Of the four NCWRC designated inland Primary Nursery Areas (PNA) approximately 15% of the estimated historic Jacks Creek watershed, approximately 40% of the estimated historic Jacobs Creek watershed, approximately 60% of the estimated historic Tooley Creek watershed and approximately 25% of the estimated historic Porter Creek watershed will remain intact. While loss of watershed area will likely have some localized affect on the tributaries originating in the project area, evidence indicates that the habitat value and nursery functions of these tributaries will not be lost. In fact, a recent article in the September 2008 edition of the NCWRC's publication "Wildlife in North Carolina" reported that recent sampling revealed a "similar mixture of fresh and saltwater species" from the PNA creeks and a man-made marsh and creek system located within the project area. This man-made marsh and creek system, known as "PA II" was created from uplands approximately 30 years ago and has functionally no watershed. As referenced in this article and in the FEIS, research conducted over 15 years ago on these same systems found little difference between the community assemblages within PA II and the surrounding creeks.

NMFS commented that Alternative L does not avoid indirect impacts to estuarine waters of Durham Creek, South Creek and the Pamlico River. NMFS stated the loss of the 4,135 acres of wetlands within Alternative L "would result in substantial and unacceptable indirect impacts to this estuarine system and its ability to support fishery resources." As discussed above, Alternative L impacts have been further reduced. Sections 4.2.1.6 and 4.2.1.11.2 discuss the controlling influence the Pamlico River, Durham and South Creek have on their respective tributaries. South Creek has an approximately 49,700 acre watershed. Approximately 18% of this, including approximately 2,000 acres of wetlands and approximately 6,757 acres of uplands,

will be affected by the proposed mining activities. As part of the compensatory mitigation plan, PCS will restore approximately 3,520 acres of wetlands previously in agricultural and silviculture production, enhance approximately 543 acres of wetlands and preserve approximately 1,710 acres of wetlands within the South Creek watershed. As discussed above and in Appendix I of the FEIS, it is expected that any loss of estuarine function experienced by South Creek will be adequately mitigated by this activity.

Durham Creek has an approximately 37,500 acre watershed. Approximately 7% of this watershed will be affected by the proposed mining activity. Otherwise, the Durham Creek watershed is relatively undisturbed and forested. The majority of impacts will occur within the Porter Creek watershed. Due to the relatively small percentage of watershed alteration and the fact that Porter Creek empties essentially at the mouth of Durham Creek, any impact to the upstream areas and functions of Durham Creek will be minimal.

Effects to the estuarine functions of the Pamlico River and greater Albemarle/Pamlico Sound Estuary as a result of this project should be minimal. The lower Pamlico River has an immediate watershed in excess of 800,000 acres; Modified Alternative L would impact less than 1% of this. While the Pamlico River and Sound do exert an influence on the salinity of the creeks within the project area as indicated by available data discussed in Sections 4.2.1.6, 4.2.1.11.2 of the FEIS, it is unlikely that the reduction of freshwater input in these tributary creeks will impact the salinity regime of the River or Sound. The contribution of nutrients including dissolved and particulate organic matter from the affected creeks may be decreased. However, this decrease should be adequately mitigated by the increased inputs from the mitigation areas. Finally, the reduction of habitat value within the tributaries of the project area, particularly those PNAs, may result in some decrease in their contribution to fish and invertebrate population within the River and Sound. This decrease too should be adequately compensated for by the increased contribution made by creeks in and around the mitigation areas.

Finally, the permit will be conditioned to require monitoring. The Water Quality Certification issued by the NC Division of Water Quality (NCDWQ) January 15, 2009, required that PCS continue the existing water management and stream monitoring plan for water quality, water quantity and biology, and that this monitoring plan be expanded into the Bonnerton and S33 Tracts. Additionally, the Corps has worked with NCDWQ, EPA, USFWS and NMFS staff to develop conditions that will require PCS to carry out monitoring to insure that unanticipated impacts to fisheries resources do not occur. The results of this monitoring will be submitted to the Corps, NMFS, the USFWS, EPA and the NCDWQ annually and will be made available either in whole or in summary to any other agency or member of the public so desiring. Input to the Corps regarding any corrective management that may be necessary will be encouraged. Analysis of the data and all subsequent input will be used by the Corps to determine whether further or additional action is needed to protect these resources.

I have considered all input provided by NMFS. I have included draft permit conditions requiring PCS to work with the Corps, NMFS and others to establish a sufficient monitoring and reporting program. I find after consideration of the information provided and the compensatory mitigation proposed, that the issuance of a permit for modified Alternative L will not result in adverse impacts to Essential Fish Habitat.

**d. Clean Air Act**

As explained more fully in Section 3.13 of the FEIS, the project is in an attainment area, and the emissions from the proposed project fall below *de minimis* levels, so that a Clean Air Act conformity determination is not required.

**e. Clean Water Act Water Quality Certification**

The Clean Water Act provides that the applicant must obtain from the North Carolina Division of Water Quality (NCDWQ) a Section 401 water quality certification that the proposed discharge will comply with applicable effluent limitations and water quality standards before I may issue a CWA permit. NCDWQ issued a conditioned certification on January 15, 2009. The conditions require sedimentation and erosion control, mitigation, groundwater monitoring, and stream and watershed monitoring. The conditions also require avoidance of 213 acres of the Bonnerton SNHA and 3 acres of wetlands on the NCPC tract. These conditions will be incorporated into the Department of the Army permit.

**f. Coastal Zone Management Act Consistency Determination**

The Coastal Zone Management Act requires that the applicant obtain from the North Carolina Division of Coastal Management (NCDCM) a concurrence that the proposed project will comply with North Carolina's coastal zone management program. NCDCM issued a conditioned concurrence on December 12, 2009 finding that the proposed project is consistent with the enforceable policies of North Carolina's coastal management program. Following issuance of the modified Water Quality Certification, NCDCM issued an amended Consistency Certification on January 30, 2009.

**9. Consideration of Agency and Public Comments**

The Corps received numerous comments on the DEIS, SDEIS and the proposed action. These were fully addressed in Appendix J of the FEIS. Additional comments were received on the FEIS and the proposed action, Alternative L. My response to those comments can be found at Attachment 1 to this document. I have considered all comments prior to making my decision on this permit application.

**10. 404(b)(1) Analysis; 40 CFR Part 230**

**a. Factual Determinations**

Pursuant to 40 CFR 230.11, the Corps must determine the potential short- term or long-term effects of a proposed discharge on the physical, chemical and biological components of the aquatic environment. These factual determinations shall be used in making a determination of compliance or non-compliance with the restrictions on discharge. My evaluation and factual determinations follow.

reclamation activities within the permit boundary are fully discussed in Section 4.1 of the FEIS. Sections 4.2.1.1-3 describe the impacts to land resources within the mine areas generally and Sections 4.2.1.1-3 describe those impacts specifically to Alternative L. Mining operations will result in substantial and permanent alteration of topography and soil profiles. Some soil profile alterations will be mitigated through the reclamation process by the use of the upper 30 feet of soil and topsoil during the reclamation process. Impacts to the existing upland and wetland communities within the mined area will be mitigated through the reclamation process. The goal of the reclamation process is to return reclaimed areas to some form of a mixed upland and wetland habitat as would be required by the mining permit issued by the NCDLR. Additionally, all wetland areas directly affected by the mining activity will be fully mitigated through PCS's compensatory mitigation plan.

The cumulative effects of the mining and development within the area are discussed in Section 4.2.1.21 of the FEIS. The majority of past and future impacts are known, as they have either already occurred, or will occur as a result of the proposed project. This activity has resulted in substantial long-term modification of topography and soil profile. However, reclamation efforts either have already, or will be required to return these areas to a useful state. Secondary effects to surrounding undisturbed areas will be minimized through high activities described in Sections 4.1, including implementation of erosion control measures and control of all surface water generated on the site.

**2) Water Circulation** and cumulative effects of the mining activity are discussed in Section 4.2.1.21 of the FEIS. Wetlands and streams within the mine area will be permanently lost, resulting in a reduction of watershed area. The compensatory mitigation plan as described above and in Appendix I of the FEIS. Although mining activities will result in the long-term loss of watershed of several creeks surrounding the project area, reclamation activities will eventually return these areas to vegetated watershed acreage.

The tributaries of South Creek within the project area will experience, on average, an approximate 5% - 50% reduction in watershed area. The remaining watershed areas, which are mostly forested, should experience no direct impact from the mining activity. Therefore, the remaining watershed areas should continue to supply runoff and cycle and supply nutrients due to supply runoff and cycle and supply nutrients to the surrounding aquatic system. Flow from including dissolved and particulate organic carbon to the surrounding aquatic system. Research completed in the vicinity of the project area suggests that this reduction of watershed maximums in upstream areas of the smaller tributaries; may result in a slight increase in salinity, which is within the normal range of salinity fluctuation currently experienced within these wind tide influenced systems. As discussed in Sections 4.2.1.6 and 4.2.1.11.2, the complex exert a controlling influence on South and Durham Creeks, which in turn substantially influence water circulation and quality in the downstream reaches of these tributaries. Therefore, downstream areas of these tributaries should

**terminations.** The progression of the mining and boundary are fully discussed in Section 4.1 of the acts to land resources within the mine areas generally and Sections 4.2.1.1-3 describe those impacts specifically to Alternative L. Mining operations will result in substantial and permanent alteration of topography and soil profiles. Some soil profile alterations will be mitigated through the reclamation process by the use of the upper 30 feet of soil and topsoil during the reclamation process. Impacts to the existing upland and wetland communities within the mined area will be mitigated through the reclamation process. The goal of the reclamation process is to return reclaimed areas to some form of a mixed upland and wetland habitat as would be required by the mining permit issued by the NCDLR. Additionally, all wetland areas directly affected by the mining activity will be fully mitigated through PCS's compensatory mitigation plan.

ity combined with other mining activity and in Section 4.2.1.21 of the FEIS. The majority of past and future impacts are known, as they have either already occurred, or will occur as a result of the proposed project. This activity has resulted in substantial long-term modification of topography and soil profile. However, reclamation efforts either have already, or will be required to return these areas to a useful state. Secondary effects to surrounding undisturbed areas will be minimized through high activities described in Sections 4.1, including implementation of erosion control measures and control of all surface water generated on the site.

**Fluctuation and Salinity Determinations.** The direct impacts on surface waters are discussed thoroughly in Section 4.2.1.21 of the FEIS. Wetlands and streams within the mine area will be permanently lost, resulting in a reduction of watershed area. The compensatory mitigation plan as described above and in Appendix I of the FEIS. Although mining activities will result in the long-term loss of watershed of several creeks surrounding the project area, reclamation activities will eventually return these areas to vegetated watershed acreage.

The tributaries of South Creek within the project area will experience, on average, an approximate 5% - 50% reduction in watershed area. The remaining watershed areas, which are mostly forested, should experience no direct impact from the mining activity. Therefore, the remaining watershed areas should continue to supply runoff and cycle and supply nutrients due to supply runoff and cycle and supply nutrients to the surrounding aquatic system. Flow from including dissolved and particulate organic carbon to the surrounding aquatic system. Research completed in the vicinity of the project area suggests that this reduction of watershed maximums in upstream areas of the smaller tributaries; may result in a slight increase in salinity, which is within the normal range of salinity fluctuation currently experienced within these wind tide influenced systems. As discussed in Sections 4.2.1.6 and 4.2.1.11.2, the complex exert a controlling influence on South and Durham Creeks, which in turn substantially influence water circulation and quality in the downstream reaches of these tributaries. Therefore, downstream areas of these tributaries should

not experience unacceptable adverse effects as a result of the reduced flows. Likewise, any resultant water quality impacts to waters of South and Durham Creeks and the greater Pamlico River Estuary should be minimal and fully offset by the benefits provided through compensatory mitigation discussed in section 7, above.

South Creek has an approximately 49,700 acre watershed. Approximately 18% of this, including approximately 2,000 acres of wetlands and approximately 6,757 acres of uplands, will be affected by the proposed mining activities. As part of the compensatory mitigation plan, PCS will restore approximately 3,520 acres of wetlands previously in agricultural production, enhance approximately 543 acres of wetlands and preserve approximately 1,710 acres of wetlands within the South Creek watershed. As discussed above and in Appendix I of the FEIS, it is expected that any changes to water circulation, flow regime or water chemistry, including salinity, experienced by South Creek will be adequately mitigated by this activity.

Durham Creek has an approximately 37,500 acre watershed. Approximately 7% of this watershed will be affected by the proposed mining activity. Otherwise, the Durham Creek watershed is relatively undisturbed and forested. The majority of impacts will occur within the Porter Creek watershed. Due to the relatively small percentage of watershed alteration it is not likely that flows and circulation patterns or salinity within Durham Creek will be significantly affected. This is further supported by the fact that Porter Creek, where the majority of the impacts will occur, empties into Durham Creek very close to Durham Creek's confluence with the Pamlico River. It is likely that the overarching influence of the River at this point will counteract any change in Porter Creek flows or salinity patterns.

Effects to the flows, circulation patterns and water quality of the Pamlico River and greater Albemarle/Pamlico Sound Estuary as a result of this project should be minimal. The lower Pamlico River has an immediate watershed in excess of 800,000 acres; alternative L would impact less than 1% of this. While the Pamlico River and Sound do exert an influence on the salinity of the creeks within the project area as indicated by available data discussed in Sections 4.2.1.6, 4.2.1.11.2 of the FEIS, it is unlikely that the reduction of freshwater input in these tributary creeks will impact the salinity regime of the River or Sound. The contribution of nutrients including dissolved and particulate organic matter from the affected creeks into the River and Sound may be decreased. However, this decrease should be adequately mitigated by the increased inputs from the mitigation areas.

It is therefore my determination that, with implementation of the mitigation plan discussed above and in Appendix I, impacts to water circulation, flows, fluctuations and salinity will not be significant or unacceptable.

**(3) Suspended Particulate/Turbidity Determinations.** As discussed in Section 4.1.1 of the FEIS, I anticipate that any potential for sedimentation and erosion during the mining activity will be minimal due to the implementation of construction techniques employed by PCS and/or measures required by North Carolina sedimentation and erosion control regulations. All storm water runoff from the mine area is controlled under a National Pollutant Discharge Elimination System (NPDES) permit issued by the NCDWQ. Therefore, it is not expected that

an appreciable increase in suspended particulates or turbidity will be experienced in surrounding waters.

**(4) Contaminant Determinations.** The presence and potential for release of contaminants is thoroughly discussed in Section 4.1.3.1 of the FEIS. With the implementation of capping requirements to mitigate for cadmium accumulation within the reclaimed areas as described above, it is not likely that the mining activity will result in the introduction or accumulation of contaminants into the terrestrial system at adverse levels. All available data from surrounding water bodies indicate that heavy metal levels are comparable to those found in most areas of the estuary and in other estuarine systems.

Data has been collected to determine whether cadmium levels in surrounding waters has been increased as a result of mining activities. Results indicate that any introduction of cadmium into surface waters occurred through discrete events or discharges. These practices have been discontinued or modified and as a result, cadmium levels have remained static or decreased. Groundwater analysis conducted within the older reclamation areas revealed that while heavy metals were elevated in some groundwater samples, all were well below national primary and secondary drinking water standards. Finally, to ensure that the reclamation practices do not result in unacceptable increases in metal content of surrounding surface or groundwater, PCS will be required by condition to any permit issued to regularly monitor both surface and groundwater.

Based on the information available to me I find that with the implementation of the proposed permit special conditions, the project will not adversely effect or significantly degrade surface waters, ground waters or the terrestrial environment through the introduction of contaminants.

**(5) Aquatic Ecosystem and Organism Determinations.** The activities associated with mining Alternative L will result in direct impacts to approximately 11,343 acres. The project will result in the loss of 3,927 acres of waters of the United States over approximately 35 years ,including 10,332 linear feet of perennial stream,12,541 linear feet of intermittent stream, 3,909 acres of wetlands, and 11 acres of ponds. The potential direct and indirect effects of this impact are thoroughly discussed in Section 4 of the FEIS.

In designing the mine boundary for this alternative, PCS considered comments from Federal and state permitting and review agencies and others to avoid and/or minimize impacts to open water areas, and areas riparian to the existing open waters. Under Alternative L, direct impacts to much of the headwaters and riparian areas of creeks within the project area, including all coastal marsh, are avoided. These avoidance efforts not only reduce the direct effects to important nursery areas of the lower Pamlico River estuary, they also minimize indirect effects by preserving watershed acreage and maintaining buffers along the tributaries within the project area. Of the four NCWRC designated inland Primary Nursery Areas (PNA) approximately 15% of the Jacks Creek watershed, 40% of the Jacobs Creek watershed, 60% of the Tooley Creek watershed and 25% of the watershed of Porter Creek will remain intact. Watershed loss as a result of mining activity will likely have some localized affect on the tributaries originating in the project area. As discussed in Section 4.2.1.11.2, these indirect impacts will primarily be a result of the loss in organic detrital matter input and change in salinity regime in the upper

reaches of these tributaries. Data collected in these areas indicate that the habitat value and nursery functions of these tributaries will not be lost.

As described in Section 4.3.1.3, mined areas are eventually reclaimed to a useful purpose, including the establishment of vegetative cover, soil stability, and water and safety conditions appropriate to the area. While the reclamation will not result in the reestablishment of the currently existing communities, some of the lost watershed function will be returned. PCS currently plans to retain ownership of much of the reclaimed area and manage the area for wildlife habitat. These areas should eventually reestablish as a mixture of upland herbaceous, shrub and forested communities and wetland hardwood forests, ponds and freshwater marshes.

I have reviewed all of the information available to me on the likely adverse effects of this action and have considered the benefits of the proposed compensatory mitigation plan as discussed above. I find that with the implementation of the compensatory mitigation plan, the mining and mine related activities authorized by the modified Alternative L will have minimal adverse effect on and will not significantly degrade the aquatic ecosystem or the organisms that depend upon it.

**(6) Proposed Disposal Site Determinations.** The mining process is described in Sections 2.1 and 2.2 of the FEIS. The reclamation process is described in Section 4.3.1. The impacts of both mining and reclamation are discussed in Sections 4.1 and 4.2. Material generated by the mining process will be contained onsite and used in the reclamation process. Therefore, the disposal site will be within the Alternative L boundary. Sedimentation and erosion to offsite areas will be minimized through the implementation of construction techniques discussed in Section 4.1, including all necessary sedimentation and erosion control measures and control of all surface waters generated on the site. Additionally, the Section 401 Water Quality Certification contains conditions for maintaining appropriate sediment and erosion control measures. These conditions will be incorporated into any permit I issue.

**(7) Determination of Cumulative Effects.** Cumulative effects are discussed in Section 4.2.1.21 of the FEIS. The large majority of cumulative impacts within the local watershed can be attributed to existing agricultural and silvicultural practices and the previous mining activities at PCS's Aurora operation. Data collected through both independent research and monitoring required of PCS indicate that to date, the mining activity has not resulted in substantial degradation of water quality or the surrounding aquatic ecosystem. Several of the creeks flowing from the project area are considered inland Primary Nursery Area (PNA) by the state of North Carolina. This includes Porter Creek, which originates within the Bonnerton Tract and flows between that tract and previously mined areas. During the 1980s PCS mined along the east bank of Porter Creek, coming within 100 feet of the shore in many locations. This mined area is now reclaimed or in the late stages of reclamation, and Porter Creek continues to function as a PNA.

In consultation with members of the review team, the Corps determined that considering a permit to cover the entire area that PCS currently intends to mine, i.e. the project area, would result in a more thorough consideration of impacts of likely remaining mining impacts in the area. The cumulative impacts of reasonably foreseeable mining activity have therefore been covered in the FEIS and discussed and considered in this decision. With the progression of the mining activity



and the implementation of the compensatory mitigation plan, agricultural activity and related runoff within the watershed should decrease. Silvicultural activities within the watershed will likely continue, however, since these activities typically involve reforestation, impact should be short term.

As discussed above, authorization of Modified Alternative L, when considered in combination with past mining activities, will result in the cumulative loss of large portions of the watersheds of tributaries to South and Durham Creeks and the Pamlico River. These tributaries will experience, on average, cumulative losses of approximately 65% of their estimated historic watersheds. The most affected of these will be Jacks Creek, with a loss of approximately 84% of its estimated historic watershed, and the least impacted will be Tooley Creek with a loss of approximately 40% of its estimated historic watershed. The loss of watershed area will likely have some localized affect on the tributaries originating in the project area. However, as discussed above in section 10.a.(5), evidence indicates that the habitat value and nursery functions of these tributaries will not be lost.

Much of the South Creek riparian corridor is currently owned by PCS and is included either in the project area or the compensatory mitigation plan. Therefore, it is not likely that any appreciable development, either residential or commercial, will take place along South Creek. There has been some discussion of an ethanol producing facility being located in proximity to Aurora. At this time, the Corps has no indication that this project will occur and no way of assessing likely impacts if plans were to go forward. If plans for this facility do move forward and authorization from the Corps is required, potential impacts, both direct and cumulative, will be fully evaluated.

**(8) Determination of Secondary Effects.** Secondary effects are discussed in Section 4.2.1.21 of the FEIS. Following mining activities, State law and regulations require mined land to be reclaimed to a useful state, including revegetation and return of some watershed function. Therefore, in the long term, effects of mining activities should be minimized. Authorization of Alternative L will result in a continuation of existing mine operation and will not result in appreciable increases in employment or payroll over that currently experienced. Therefore, secondary development associated with residential, commercial and infrastructure construction is not expected to increase as a result of this activity. All foreseeable highway, railway and utility relocation necessary for the mining of Alternative L have either taken place or have been considered in this evaluation.

#### **b. Restrictions On Discharge**

**(1) Least Environmentally Damaging Practicable Alternative (LEDPA).** The 404(b) (1) Guidelines Restrictions on Discharge (40 CFR Part 230.10) specify that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem. Part 230.10(a)(2) defines practicable as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose." The determination of the LEDPA must be made without considering compensatory mitigation.

The agreed upon purpose and need for this action is "To continue mining of its [the applicant's] phosphate reserve in an economically viable fashion. More specifically, the applicant's purpose and need is to implement a long-term, systematic and cost-effective mine advance within the project area for the ongoing PCS mine operation at Aurora, North Carolina." To be considered "systematic" an alternative should allow mining to proceed in a reasonable fashion that does not inappropriately restrict potential to recover the resource or increase cost.

PCS has consistently asserted that to be sufficiently "long-term" any alternative must provide approximately 20 years of cost effective mining, to allow time to make decisions on the large scale investments in property, personnel, and equipment that must be made to efficiently mine. This position is consistent with the Corps' decision to consider 20 year mine plans in evaluating the 1997 CWA permit, as well as EIS's for other phosphate mine plans prepared in other parts of the country. It is noteworthy that this permit process has taken over eight years of evaluation and review before reaching this decision point. Additional permitting time may be required if this or any future permit is elevated pursuant to 33 U.S.C.A. Section 404(q) or vetoed pursuant to 33 U.S.C.A. Section 404 (c).

The Corps initially considered a 20 year timeframe to be reasonable. PCS, however, introduced its original preferred alternative (AP), which provided only 15 years of mining. On that basis, the Corps determined in the DEIS that at least within certain parameters, approximately 15 years provides an adequate known planning horizon, and compared each alternative on that basis. As more fully discussed in Section 2.7.5 of the FEIS, the Corps determined that only alternatives that provide PCS with costs that are currently considered practicable for approximately 15 years and a reasonable plan for additional future mining is a practicable alternative.

**(2) Practicability Evaluation.** Section 2 of the FEIS discusses the process of alternative selection and my practicability determinations. All of the alternatives carried forward for detailed study were determined to be logistically and technologically practicable. The No Action boundary, while technologically practicable, presents substantial logistic constraints based largely on the requirement for multiple, non-continuous mining pits. Additionally, the No Action Boundary allows only 12 years of mining. All mining is within the S33 Tract and at costs substantially exceeding what I consider practicable. The No Action Boundary is therefore not a practicable alternative.

Perhaps the most difficult part of the practicability determination has been determining what constitutes a practicable cost. Generally, an alternative is not practicable if it is unreasonably expensive. Section 2.7 of the FEIS thoroughly discusses the method employed by the Corps to determine what constitutes a practicable alternative cost for the proposed activity. This section also discusses how alternatives were eliminated as impracticable from a cost standpoint and which alternatives the Corps considers to be practicable. Comments received on the FEIS indicate that there remains some misunderstanding of and disagreement on this issue. Therefore, I will attempt here to again summarize the pertinent points.

**(a) The Marston Cost Model.** In 2002, the Corps directed PCS to provide an economic model which could be used to compare cost parameters among various alternatives. In 2003, PCS presented a model developed by the mine consulting firm Marston, Inc. designed to 1)

estimate operating costs for any mine plan boundary, 2) develop cost estimates for mining within these boundaries using a standard cost base and consistent methods for estimation, and 3) address site specific operating and development costs.

**(b) Input Data.** In early 2006, the Corps provided each review team member with the results of the cost model runs for each of the alternatives identified at that point. Expense data was entered into the model in basically three ways; day-to-day operational costs (eg. labor, maintenance, etc.) were fully expensed in the year during which they are incurred, capital expenditures for large equipment were expensed over the estimated life of the equipment, and capital expenditures for mine development were expensed over the entire mining area made available by the particular development (e.g. cost of opening the mine in a new tract or area, such as opening a new pit, utility and road relocations were expensed over all years of mining within that tract or area). The model programmed with data in this fashion has been referred to as the "Marston Full Plan" or the "Original Marston model".

**(c) Analysis and Evaluation of Cost Model Results.** Suggested methods for analysis of the cost data include comparison of overall cost between alternatives and comparison of alternative costs to the applicant's "profit". These methods and the difficulty in applying each are discussed in Section 2.7 of the FEIS. One major concern with each of these approaches is in determining a frame of reference with which to analyze the information. As discussed in the FEIS, approaches simply comparing overall cost between alternatives would require the Corps to set a limit or range of acceptable cost increase over the applicant's original preferred alternative, with little information on which to base such a decision. Approaches comparing the cost information to the applicant's profit would require the Corps to first define what constitutes "profit" (gross margin, operating income, internal performance goals, etc.), then to determine the period over which to assess profit (last year, last five years, etc.) and finally, in order to arrive at a practicability determination, decide how much profit the applicant should be allowed. As stated in Section 2.7.4.1 of the FEIS, regulations and guidance implementing NEPA and CWA Section 404 do not require the Corps to establish such a profit limit for a private corporation and, in fact, recommend against the cumbersome inquiry. Regulatory Guidance Letter 93-02, "Guidance on Flexibility for the 404(b)(1) Guidelines and Mitigation Banking."

In both the draft and the final EIS, the Corps suggested comparison of the predicted yearly costs per ton of the various alternatives to the "price" or "value" of phosphate ore reported yearly by the United States Geologic Survey (USGS) to give an indication of cost practicability. This estimate, developed by an independent Federal government agency and derived by comparison of industry information, provides the Corps an unbiased reference for determining what constitutes a practicable alternative from the standpoint of cost. Comparing this information to predicted costs, as well as comparing overall and yearly cost between alternatives, the Corps eliminated alternatives that involved immediate relocation to the S33 Tract, in whole or in part, as being unreasonably expensive and not practicable. This approach is more thoroughly explained in Sections 2.7.4.4 and 2.7.5 of the FEIS.

Following release of the DEIS, PCS submitted a run of the Marston model using a quasi-cash cost accounting method for input data. This run of the cost model expensed capital and development expenditures during the years in which the commitment to expend the funds would

have to be made, rather than amortizing the costs over the years that mining was made possible by those expenditures. PCS presented this information, in part, to demonstrate that the lower mining costs predicted in the original cost model runs for the initial years of the S33 Tract could be misleading, if not considered in the context of the entire alternative. This information generated lively debate over whether a full cash cost accounting method of calculating input data should be used for all cost comparisons in lieu of the methods applied in the original Marston Model. Ultimately, the Corps decided that such an analysis would result in no better information than had already been obtained and presented, and would, in the end, not further inform the decision maker as to the practicability of alternatives.

The Corps did, however, acknowledge that PCS's point of considering the S33 Tract cost information in the proper context was valid. I find PCS's argument that, for the purpose of my analysis, the cost of mining the initial few years of S33 must be considered with recognition of the real development cost and how they must be applied. Important facts that must be considered are that; 1) there is a somewhat fixed development cost associated with the relocation of the mine to the S33 Tract and the affects of this cost on yearly mining expense within the cost model is dependant upon the number of years over which it is amortized and 2) the costs of mining within the S33 Tract increase substantially as mining progresses southward in that Tract, independent of the development costs and unlike the other Tracts, there is a large area of the S33 Tract that cannot be mined at what is currently considered a reasonable cost.

The relocation of the mine to the S33 Tract requires that a substantial amount of capital be committed for establishment of a new initial pit, necessary infrastructure relocation and investment in material transport equipment. These development costs total approximately \$103M, to be expended at the time of or shortly after the mine is relocated to S33, and are the same regardless of how many years of mining the relocation provides. In the original cost model, the development capital required to mine in the S33 tract was amortized over the years made available for mining in the S33 Tract; for example, in the case of the SCRA alternative, costs were amortized over almost 20 years of mining. For each of the holistic alternatives, the reported yearly cost of mining in the upper part of the S33 Tract appear essentially equal to or lower than the USGS value estimate. However, because the original Marston Model amortizes the development cost over the entire alternative, these lower costs are only realized if the entire area presented by the alternative is mined.

The northernmost portion of the S33 Tract provides for the lowest cost mining of any area within that Tract. The holistic alternative mine plans include mining this area first as a three dragline width pass from west to east. The mine would then shift south and mine a three dragline pass, east to west. Due to factors including ore depth, ore quality and distance from the processing facility, costs associated with this second pass increase substantially. From that point, mining cost continues to increase over the remainder of the Tract. Even if considered independent of the development costs associated with the mine relocation, mining costs for much of the S33 Tract still would meet or exceed the average USGS cost estimates. For this reason, I do not consider mining most of the area in the S33 Tract to be currently practicable.

I have considered whether amortization of the entirety of the development over the initial, less expensive, years of the S33 Tract would present any area for mining at a practicable cost. For

example, the SCRA alternative includes 20 years of mining in the S33 tract. The annual costs of mining the last 13 of those years is well above the average USGS estimated cost and therefore not practicable under current conditions. On that premise, I considered the cost of mining the initial 7 years with the approximately \$103 million in development cost amortized over only that period. This resulted in mining costs that still approach or exceed the average USGS cost estimates, exceed any cost previously experienced by PCS, and exceed the cost of mining within the other tracts under the SCRA plan by 10 – 16% and under the EAPA plan by 13 – 18%. I consider these costs standing alone to be unreasonable; the fact that all of the following years of mining under this alternative become increasingly expensive underscores the impracticability of mining this tract under current market conditions.

Therefore, the Corps does not consider alternatives that would require PCS to move to S33 within the initial approximately 15 year planning window practicable, because they would require PCS to commit to expending the development capital within the 15 years when it is not clear that those funds could be recouped. This is not a rejection of the Marston full cost model, nor is it adoption of the cash cost model. This is recognition of one limitation of the Marston full cost model in the face of a particular circumstance (that mining S33 may not be practicable and amortizing costs over a period of mining which very possibly may not occur is inappropriate.)

Of the alternatives carried forward for detailed study, I consider the AP, EAPA, EAPB, SJAA, M and L to be practicable alternatives from the standpoint of cost. The AP alternative encompasses a mining plan only within the NCPC tract. The other alternatives I find to be practicable have greater total impacts than the AP alternative, however, these plans also include the Bonnerton and S33 tracts within their mine boundaries, and each provides several more years of mining at current levels than the AP alternative. The appropriate comparison to the AP alternative is therefore the impacts to the NCPC tract of each of the remaining alternatives. Alternatives SJAA, M and L would result in fewer impacts to the NCPC tract than does Alternative AP.

I realize that any approximately 15 year alternative would have fewer impacts than any of the holistic alternatives. In consultation with members of the review team, however, the Corps determined early in this process that making a permit decision addressing the entire project area is appropriate. Considering holistic alternatives allows the Corps and others to consider more fully adequate avoidance and minimization of impacts over the entire project area, as well as potential impacts of this project over an extended period of time. I therefore do not consider it necessary to consider further alternatives limited to mining for the approximately 15 year planning horizon in making my decision on the least damaging practicable alternative.

Based on the record before me, I find that Modified Alternative L is the least damaging practicable alternative.

### **c. Degradation of Waters of the United States**

The 404(b)(1) guidelines state that the Corps may not issue a permit if it will result in significant degradation to the waters of the US. In making this decision, my key focus is on the effect of the impacts on human health and welfare; lifestages of aquatic life such as plankton, fish and shellfish and other wildlife dependant on the aquatic ecosystem; special aquatic sites; aquatic

ecosystem diversity, productivity and stability; and recreational, aesthetic and economic values (40 CFR § 230.10(c)).

The affected environment and the potential impacts, both direct and indirect, have been thoroughly examined in the FEIS. The likelihood and magnitude of these impacts are further discussed above. Indeed this authorization will affect a substantial amount of both upland and wetland habitats as well as streams. However, several mitigating factors must be considered. First, all impacts will not occur at once, but rather will occur over time, most over the initial 15 year period. Additionally, PCS will be required by conditions of this authorization, and likely by the State, to reclaim mined areas to a vegetated state. This reclamation will progress over time along with impacts. Finally, successful completion of the compensatory mitigation plan described in the FEIS and constructed pursuant to Corps approved site specific plans will compensate for the unavoidable impacts associated with the mining activity.

There has been some discussion that impacts to the Bonnerton nonriverine wet hardwood forest, considered by the NCNHP to be a significant natural heritage area (SNHA) of national importance, would constitute significant degradation of the waters of the United States under the 404(b) (1) Guidelines. Based on a review of all available information I understand that the NCNHP's designation of this site as a SNHA is largely based on the fact that it is a terrestrial community that has become increasingly rare in North Carolina and not necessarily because of any unique or special contribution to the aquatic ecosystem. Therefore, I do not believe it is appropriate to consider impact to this specific area a significant degradation to the aquatic environment solely on the basis of its designation as a SNHA by the NCNHP. Nevertheless, impacts to approximately 64% (174 acres) of the site has been avoided by Modified Alternative L. Additionally, the Permittee has agreed to place these avoided areas under a conservation easement, further protecting the site. Finally, the proposed mitigation will result in reestablishment and/or permanent preservation of over 1,000 acres of this community type including the preservation of an approximately 40 acre non-riverine wet hardwood site immediately adjacent to the Hells Swamp mitigation site that has been designated an SNHA by NCNHP. Development of the proposed mitigation will yield satisfactory compensatory mitigation to sufficiently offset losses of part of the Bonnerton system.

I further find that the proposed compensatory mitigation will adequately offset the unavoidable impacts associated with the modified Alternative L. Compensatory mitigation for all unavoidable impacts is discussed in detail in Section 7, above, as well as in Appendix I of the FEIS. Figures 7, 8 and 9 of Appendix I provide a graphical representation of the mitigation sites in relation to the permit area. As compensatory mitigation for the proposed impact, PCS will provide 2:1 restoration or restoration equivalent for each acre of wetland impacted. This approach is consistent with EPA Region IV's mitigation policy and standard mitigation banking and permitting within North Carolina. Stream mitigation will be provided in several of the mitigation sites and the ratio of linear feet impacted to linear feet mitigated will meet or exceed the ratios recommended in the Wilmington District's April 2003 Stream Mitigation Guidelines (1:1 for poor quality streams, 2:1 for good quality streams and 3:1 for excellent quality streams).

Within and adjacent to the South Creek watershed, PCS will restore approximately 3,520 acres of wetland and 3,000 linear feet of stream, enhance approximately 543 acres of wetland and

preserve approximately 1,710 acres of wetland and 30,696 linear feet of stream. As further compensatory mitigation, PCS will restore approximately 885 acres of wetland and 19,783 linear feet of stream, enhance 46 acres of wetlands and preserve 41 acres of wetlands in the watershed of Pungo Creek, which flows into the Pungo River, a tributary to the Pamlico River. PCS will also restore 221 acres of wetland and 12,467 linear feet of stream, enhance 38 acres of wetlands and preserve 20 acres of wetland and 2,155 linear feet of stream within the upper watersheds of 2 tributaries of Bath Creek, a tributary to the Pamlico River. All remaining required mitigation will come from an approximately 4,200 acre site also located in the watershed of the Pungo River and comprised of 3,342 acres of wetland and 8,793 linear feet of stream restoration, 129 acres of wetland and 7,994 linear feet of stream enhancement and 701 acres of wetland preservation. The majority of the mitigation work will take place within the same 8-digit hydrologic unit (HUC) as the project (HUC 03020104). The only exception is a 481 acre portion of the Parker Farm, one of the South Creek sites, which is located within an adjacent hydrologic unit (HUC 03020105) immediately to the south of HUC 03020104.

Construction on several of the sites has been completed (Parker Farm, Gum Run, Bay City Farm and Upper Back Creek). Currently, PCS proposes to have all sites constructed no later than 2015. Table 3 depicts mitigation available and construction completion date. By this schedule, all mitigation will be in place before the impacts for which they are mitigating occur. Any permit I issue will be conditioned to require PCS to adhere to the mitigation construction timelines indicated in Table 3, and to periodically submit information demonstrating compliance with construction and monitoring timetables and achievement of success criteria. These reports will be submitted for review prior to pre-determined impact milestones

Finally, the NC Division of Water Quality has issued a Water Quality Certification pursuant to Section 401 of the Clean Water Act, finding that Alternative L will not result in a violation of applicable Water Quality Standards.

After consideration of the above factual determinations in light of the information contained in the FEIS and the overall record for this case, it is my determination that with the implementation of the attached Special Conditions, including full and successful completion of the compensatory mitigation plan, authorization of Modified Alternative L will not cause or contribute to significant degradation of the waters of the US.

#### **d. Avoidance and Minimization of Impact**

The alternative selection process is thoroughly described in Section 2 of the FEIS. Minimization efforts are demonstrated by contrasting the direct impacts to aquatic systems under the various alternatives as described in Section 4.2.2.11.2 and presented here in Table 1. Table 4-20 of the FEIS presents data on wetlands and biotic community impacts for each alternative considered. Pursuant to 40CFR Part 230.10(d) I have considered whether all appropriate and practicable steps have been taken to minimize potential adverse effects to the aquatic ecosystem and in accordance with the 1990 Memorandum of Agreement between EPA and the Corps regarding the determination of mitigation under the Clean Water Act 404(b)(1) guidelines, I have first considered avoidance through the determination of the least environmentally damaging practicable alternative and then considered further steps to minimize impacts including further

reduction of direct impacts as well as temporal minimization of impacts through permit conditions addressing timing of actual impacts and reclamation.

PCS's initial request was for authorization of the AP Alternative within the NCPC Tract. This mine plan avoided direct impacts to approximately 198 acres (5%) of the established 3,608 acre project area on NCPC. This avoidance included 140 acres (6%) of the waters of the US within the NCPC Tract project area. Approximately 131 of the 140 acres avoided by the AP Alternative are Public Trust Waters or Coastal Marsh Areas of Environmental Concern as regulated by NC Division of Coastal Management. This alternative would have resulted in recovery of 75,798,000 concentrate tons of the available ore at an average cost of approximately \$21.71 per ton. PCS was clear that its intention would then be to apply to mine the Bonnerton Tract and, if economically viable, the S33 Tract.

Based on PCS's intention to mine all three tracts if economically viable, the Corps, in consultation with the Review Team, decided that PCS should explore holistic mine plan alternatives that included mining in all three Tracts. PCS submitted the EAPA/B Alternatives in response to this decision. The EAPA/B Alternatives avoid direct impacts to 1,139 acres (8%) of the 15,100 acre project area including 712 acres (11%) of the waters of the US within the Project Area. Again, this avoided area includes approximately 136 acres of Public Trust Waters or Coastal Marsh. This alternative would have resulted in recovery of approximately 244,122,000 concentrate tons of the available ore at an average cost of approximately \$21.29 in the NCPC Tract, approximately \$22.32 in the Bonnerton Tract and approximately \$26.72 in the S33 Tract. The Corps evaluated several other alternatives in the DEIS.

Following the release of the DEIS, the Corps requested PCS explore Alternative L. Along with the required study of Alternative L, PCS submitted Alternative M as a potentially practicable alternative. Alternative M avoided direct impacts to 2,528 acres (17%) of the 15,100 acre project area including 1,788 acres (28%) of the waters of the US within the project area. This alternative would have resulted in recovery of approximately 204,269,000 concentrate tons (approximately 80%) of the available ore at an average cost of approximately \$21.51 in the NCPC Tract, approximately \$23.47 in the Bonnerton Tract and approximately \$27.16 in the S33 Tract.

By letter dated April 25, 2008, PCS requested authorization of Alternative L as described in the FEIS. This alternative avoids approximately 3,191 acres (21%) of the 15,100 acre project area including 2,245 acres (35%) of the waters of the US within the project area. This alternative would have resulted in recovery of approximately 185,213,000 concentrate tons (approximately 75%) of the available ore at an average cost of approximately \$22.01 in the NCPC Tract, approximately \$23.48 in the Bonnerton Tract and approximately \$27.09 in the S33 Tract.

Following release of the FEIS, the Corps and NCDWQ worked with PCS to further minimize the impacts associated with Alternative L. In March of 2009, the Corps notified EPA, NMFS and USFWS pursuant to CWA Section 404(q) of our intention to issue a conditioned permit for a modified version of Alternative L that would have avoided 2,403 acres (38%) of the waters of the US within the project area. EPA ultimately chose to request elevation of this decision to the Assistant Secretary of the Army for Civil Works (ASA-CW) pursuant to CWA Section 404(q). Following a site visit and thorough review by ASA-CW and USACE Headquarters personnel,



the ASA-CW remanded the decision back to the Wilmington District Commander with instructions to work with PCS, EPA, USFWS and NMFS to identify any further impact minimization deemed practicable or otherwise agreed to by PCS. As a result of this effort, further minimization was identified and agreed to by the PCS. Modified Alternative L avoids direct impacts to approximately 3,757 acres (25%) of the 15,100 acre project area including 2,453 acres (38%) of the waters of the US within the project area and result in recovery of approximately 172,473,000 concentrate tons (approximately 66%) of the available ore. Modified Alternative L avoids all of the 49 acres of Public Trust Waters and 87 acres of brackish marsh within the project area as well as 142 acres (70%) of the bottomland hardwood forest. Within the Bonneron Tract, Modified Alternative L avoids approximately 212 acres (78%) of the NCNHP SNHA. The modified Alternative L will result in the direct loss of 3,927 acres of waters of the US including 10,332 linear feet of perennial and 12,103 linear feet of intermittent stream.

To further minimize impacts, any permit I issue will be conditioned to ensure that mine related impacts do not occur on any area until necessary to facilitate the mine progression. Figure 2 shows the areas to be impacted under modified Alternative L and the timeframe during which mine preparation work would begin. The reclamation efforts will further minimize the duration of these impacts. While reclamation will not return the impacted areas to pre-project conditions, reclamation activities will return mined areas to a stable and vegetated condition. These reclaimed areas will be contoured to allow overland flow to be returned to the surrounding natural areas and creeks to extend practicable. To assure timely accomplishment of the reclamation, permit conditions will require reclamation milestones be met. These conditions will be coordinated with the NC Division of Land Resources.

This incremental progression of impacts combined with the reclamation activities will minimize temporal losses and will allow mobile terrestrial and aquatic wildlife species to seek refuge in other areas as mining progresses. Additionally, reclamation efforts will result in reestablishment of terrestrial wildlife habitat in the mined areas. This incremental mine progression, combined with reclamation efforts, will also ensure over time that wildlife populations are not isolated by the work.

I find that, with the minimization measures discussed above, PCS has taken all appropriate and practicable steps to minimize adverse impacts to the aquatic ecosystem.

## **11. Public Interest Review**

All public interest factors have been reviewed. Both cumulative and secondary impacts on the public interest were considered. The following public interest factors are considered relevant to this proposal.

**a. Conservation.** Avoidance and minimization efforts, as discussed above and in Sections 2 and 4 of the FEIS, have resulted in a mining footprint that minimizes impacts to the aquatic environment to the maximum extent practicable. Modified Alternative L as conditioned allows for reasonable recovery of the available mineral resource while resulting in only those environmental impacts necessary to make that recovery at a reasonable and practicable cost.

## **b. Economics**

The public need and local, regional and state economic benefit are discussed in Sections 1.2.1, 3.17, 4.2.1.17 and 4.2.2.17 of the FEIS. PCS is the largest private employer in Beaufort County, and one of the largest private employers in the region. PCS outputs over \$64 million in direct payroll per year with approximately half going to employees in the mine and mill operation. PCS is Beaufort County's largest taxpayer and based on the economic activity generated throughout the state, North Carolina's annual tax impact from PCS Phosphate is well over \$70 million.

Recreational and commercial fisheries, tourism and agriculture also play a major role in the local economies of Beaufort and surrounding counties, as discussed in Sections 3.17.1.1.2.3 and 3.17.1.1.2.4. The areas proposed to be mined do not support tourism, and tourism should therefore not be appreciably affected. There may be some minor, localized impacts to agriculture operations due to the loss of farmlands either as a result of mining or compensatory mitigation; however, the agriculture industry as a whole will benefit from the products produced by PCS. There may be some localized impacts to commercial fisheries landings due to the potential reduction of nursery functions within waters immediately adjacent the project area. This impact should not be substantial and should be offset by the enhancement of fisheries resources in adjacent areas of the Pamlico River through the benefits provided by the compensatory mitigation.

## **c. Aesthetics**

Section 4.2.1.17.10 of the FEIS discusses impacts to aesthetics. The aesthetic value of the project area has been historically impacted through mining, agricultural and silvicultural activities. The aesthetic value of the mine area will be impacted during mining activities but should largely be returned through reclamation activities. Large, vegetated earthen dikes are constructed around the mining activities so the impacts to aesthetics of the surrounding areas should not be appreciably affected.

## **d. General environmental concerns**

Sections 4.1 and 4.2 of the FEIS discuss the likely affects of the project on environmental resources. Section 4.3 of the FEIS discusses the reclamation efforts and proposed compensatory mitigation, detailed in Appendix I of the FEIS. The mining activities associated with the authorization of Modified Alternative L will impact important terrestrial and aquatic resources and will alter the natural environment of the project area. The completion of reclamation activities will ensure that, in the long term, the project area is returned to some useful state, providing return of some functions similar to that provided by the existing natural environment. Implementation of the compensatory mitigation plan will ensure that any permanent environmental impacts are adequately offset.

#### **e. Wetlands**

Sections 4.1 and 4.2 of the FEIS discuss the likely affects of the project on wetlands in and around the project area. The permanence and severity of those affects is also discussed above. I recognize that the proposed project includes permanent impacts to a substantial area of wetlands, which serve important functions, including flood storage, nutrient cycling and habitat. PCS has demonstrated that impacts to wetlands are necessary in order to provide practicable recovery of the ore resources. In compliance with the 404(b)(1) guidelines, all appropriate and practicable steps to avoid and minimize impacts to wetlands have been taken. This avoidance and minimization has focused on avoiding direct impacts to open waters and wetlands riparian to those waters and avoiding fragmentation of large contiguous wetlands. As discussed fully in Appendix I of the FEIS and above, all unavoidable impacts to wetlands will be offset by PCS's proposed mitigation plan.

Modified Alternative L includes impacts to a site the North Carolina Natural Heritage Program has characterized as a significant natural heritage area of national importance. The context of that assessment and its implications for my decision are thoroughly addressed above. PCS has made every appropriate and practicable attempt to minimize impacts to these and other important wetlands, and has offered compensatory mitigation at the Hells Swamp site to specifically offset unavoidable impacts to this area.

I have considered the overall impacts to wetlands, both individually and cumulatively, the efforts undertaken to avoid and/or minimize those impacts and the degree to which those impacts will be offset by the compensatory mitigation. I have also considered the elements of the public interest served by the authorization of this project and my finding that the modified Alternative L is the least environmentally damaging practicable alternative. Based on this evaluation, I have determined that the overall project will benefit aspects of the public interest, and the wetland impacts associated with Modified Alternative L are necessary for the practicable undertaking of the overall project. I have also determined that the lost or degraded functions of the impacted wetlands will be returned or offset by the reclamation and compensatory mitigation described in Section 4.3 of the FEIS. Therefore, considering the degree to which the wetland impacts are minimized and compensated for, I have determined that the benefits gained by these impacts outweigh the overall impacts.

#### **f. Historic properties**

As described in Section 4.2.2.16, investigation of the entire 15,100 acre project area revealed no sites either listed or eligible for listing in the National Register of Historic Places. By letter dated July 27, 2006, the NC Department of Cultural Resources concurred with this finding and that no further cultural resource investigation was necessary. It is therefore my finding that the proposed alternative L will result in no effect to historic properties either listed or eligible for listing in the National Register of Historic Places pursuant to Section 106 of the National Historic Preservation Act.

#### **g. Fish and wildlife values**

Section 4.2.1.11 of the FEIS discusses likely impacts to fish and wildlife values. The scale and likely magnitude of these impacts are discussed above. With modified Alternative L all appropriate and practicable steps to minimize the adverse effects of this action on the aquatic environment have been taken. Minimization efforts have resulted in the maintenance of wildlife corridors around all major water bodies. Additionally, conditions included in any authorization will ensure that impacts and reclamation occur over time, thereby affording more motile wildlife the opportunity to relocate to undisturbed or reclaimed areas.

Section 4.2 of the FEIS thoroughly discusses the likely indirect effects of the project on surrounding wetlands and aquatic habitat, including nursery areas and EFH. As discussed above, the project will likely result in some modification of the ecosystems of the upper reaches of tributaries located within the project area, but outside the actual impact footprint. Impacts will, however, be minimized by the avoidance of riparian wetlands and watershed. As referenced throughout Sections 3 and 4 of the FEIS, onsite research indicates that while the nursery functions of these areas may be impaired to some degree, they will not be completely lost. It is fully expected that nutrient cycling will continue, organic matter will continue to be provided and any changes in water quality will be within the toleration limits of most aquatic species present. This, combined with the benefits provided to these and other nursery areas within the watershed by the compensatory mitigation efforts should ensure that overall impacts to nursery functions and habitat suitability of the lower Pamlico River estuary are appropriately minimized, and are within acceptable limits.

#### **h. Flood hazards and Floodplain values**

Flood storage reduction due to local wetland losses associated with this project is not likely to result in adverse impacts to neighboring properties or to the extended Pamlico River watershed. Wetland restoration associated with PCS's mitigation plan will likely increase the flood storage capacity within the hydrologic unit as a result of additional wetland acreage (restoration of wetlands at a ratio greater than 1:1). Additional discussion of flood storage and storm flood abatement can be found at Sections 4.2.1.7 and 4.2.2.7 of the FEIS.

Impacts to floodplain values related to water resources, cultural resources and cultivated resources are thoroughly discussed in Sections 4.1 and 4.2 of the FEIS and elsewhere in this document. The proposed floodplain impacts associated with Modified Alternative L have been minimized to the maximum extent practicable as discussed above in the 404(b)(1) analysis. This minimization, combined with the compensatory mitigation described in Section 4.3 and Appendix I of the FEIS will ensure that impacts to the floodplain resources are not contrary to the public interest.

As directed by Executive Order 11988, agencies shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare and to restore and preserve the natural and beneficial values served by floodplains. The potential impacts of the proposed action on floodplain values was discussed in the DEIS and the FEIS. I have considered the potential affects of this authorization on floodplains and I find that, as discussed above, PCS has

taken all appropriate and practicable steps to minimize the impacts of the proposed project on floodplain values.

**i. Land use**

The majority of land within the boundary of Modified Alternative L is either owned or controlled by PCS. As such, public access and use of much of this land is limited. Implementation of this project will not restrict the general public's use of surrounding lands.

**j. Navigation**

There will be some impacts to perennial and intermittent streams associated with mining under Modified Alternative L, however, these impacts will occur in areas not considered navigable. This project will not restrict navigation within navigable or Public Trust waters.

**k. Shore erosion and accretion**

This project should have no appreciable affect on the erosion and/or accretion of shoreline.

**l. Recreation**

Section 4.2.1.17.9 addresses impacts to recreational resources. There may be some localized decline in the availability of fisheries sought by recreational fishermen, however, this decline should not be substantial and should be offset by the enhancement of fisheries resources in adjacent areas of the Pamlico River through the benefits provided by the compensatory mitigation.

**m. Water supply and conservation**

As discussed in Sections 4.1.2.3 and 4.1.2.4 any mining at this site will require depressurization of the Castle Hayne aquifer as well as local shallow aquifers. These depressurizations should not result in any adverse affect or long term reduction in these systems. As discussed in Section 4.2.2.4, any impacts to local water supplies attributable to the depressurization will be fully mitigated by PCS.

**n. Water quality**

On January 15, 2009 the NC Division of Water Quality issued a Water Quality Certification pursuant to Section 401 of the Clean Water Act, finding that Modified Alternative L will not result in a violation of applicable Water Quality Standards.

**o. Energy needs**

The PCS operation at Aurora does have some ability to generate electricity. This is predominantly for use within the operation but is at times sold to the local electric provider. The authorization of Modified Alternative L would constitute a continuation of existing operations

but not an expansion of production. Therefore, energy demands in the form of electricity and fuel should have no appreciable change.

**p. Safety**

The authorization of Modified Alternative L would constitute a continuation of existing operations and must be fully compliant with all Occupational Safety and Health Administration (OSHA) and Mining Safety and Health Administration (MSHA) requirements. Dike structures are not likely to present danger to the surrounding area or the general public. Safety and reliability of all dike structures is discussed in Section 4.3.1.5.4.

**q. Food and fiber production**

The authorization of Modified Alternative L will not directly result in any production of food or fiber and will not have a substantial negative effect on the production of food or fiber. The mining, reclamation and mitigation efforts will result in the removal from production of agricultural and silvicultural lands. However, the overall effect on the regional production of agricultural and silvicultural commodities should be negligible. The authorization will have indirect positive effects by allowing for the recovery of phosphate ore to be used in the production of fertilizer and livestock feed supplements.

**r. Mineral needs**

The authorization of Modified Alternative L will allow for cost effective recovery of one of the United States' largest deposits of phosphate ore. Over the 35 – 36 years of operation included in the modified Alternative L, PCS will recover approximately 172,473,000 tons of phosphate concentrate. Currently, this mine and operations in Florida account for more than 85% of the domestic output of phosphate rock. Section 1.3 of the FEIS discusses both the local and national need for the product produced by this operation. According to USGS, more than 90% of the phosphate rock mined in the US is used in the production of fertilizers and animal feed supplements. Currently, the US is dependant upon foreign sources for approximately 10 – 14% of the phosphate rock we consume. As recovery at the few remaining mining operations becomes limited, the US reliance on foreign suppliers for this necessary commodity will increase.

**s. Considerations of property ownership**

The Applicant began purchasing land in the early 1960s. PCS currently owns or holds mineral rights to approximately 95% of the project area. In making this decision, I have considered the right of the property owner to reasonable use of its property. I have balanced this with the rights and interest of the general public to environmental protection. As discussed throughout the FEIS and this document, the proposed work, when considered in light of the reclamation requirements and the compensatory mitigation, should not result in substantial adverse impacts to the aquatic environment. I have further considered the degree to which the proposed project will affect real property not under the ownership of PCS. The work will not affect full and free access to surrounding properties nor should it result in any substantial degradation of surrounding

properties. It is my determination that the authorization of modified Alternative L will allow PCS reasonable use of its property while sufficiently protecting the rights of surrounding property owners and the general public.

**12. Territorial sea, activities affecting coastal zones, activities in Marine Sanctuaries.**

This project will have no effect on the limits of the territorial sea or on Marine Sanctuaries. NCDCM issued a conditioned concurrence on January 30, 2009 finding that the proposed project is consistent with the enforceable policies of North Carolina's coastal management program.

**13. Other Federal, state or local requirements**

My issuance of any authorization for this activity does not remove the responsibility of PCS to obtain any other required federal, state or local authorizations.

**14. Findings and Conclusions**

I have reviewed the proposed project pursuant to the 404(b)(1) guidelines (40 CFR Part 230). On the basis of my analysis, discussed in greater detail in the FEIS and Section 10, above, I find that modified Alternative L is the least damaging practicable alternative, and that Alternative L, as modified, avoids and/or minimizes impacts to wetlands and other waters to the maximum extent practicable. I have also found that PCS's proposed work would eliminate or degrade waters of the United States, specifically, the wetlands and other waters that will be mined. I find, however, that the implementation of the proposed compensatory mitigation plan will adequately compensate for the wetland losses associated with Alternative L, as modified, so that the proposed plan, including the mitigation, does not cause or contribute to significant degradation of the waters of the United States.

In addition, I have found that the proposed work will reduce the watersheds of creeks that are tributaries of the Pamlico River. These impacts are not permanent; I have conditioned the permit to require that these mining areas be reclaimed to a useful state that will contribute watershed functions to the surrounding waters. The compensatory mitigation discussed in Appendix I of the FEIS and Section 7, above, will also offset impacts of this loss of drainage area. The mitigation plan will not replace the streams and wetlands mined; however, it will restore wetlands and streams in other areas feeding into South Creek, the Pamlico River and the Albemarle/Pamlico Estuary, and compensate for any decreases in productivity and habitat values in the areas adjacent the mined resources.

I have reviewed and evaluated the impacts of this application, considering all relevant public interest factors as discussed in Section 11 of this document, the impacts of this application described in the FEIS, and the comments of Federal and non-Federal agencies, environmental groups and other members of the public.

I find that the work can be permitted in accordance with regulations published in 33 CFR Parts 320-327. My decision to issue this permit is based on my evaluation of the probable impacts, including cumulative impacts, as described in the FEIS, and anticipated effects on the public interest. Evaluation of the probable impacts that the proposal could have on the public interest

included a careful weighing of all relevant factors. The benefits that reasonably could be expected to accrue from the proposal, including the public's need for phosphate products and the economic benefit the mine provides the region, and PCS's private need to utilize its phosphate resources in an economically viable manner, were balanced against reasonably foreseeable detriments, including the loss of wetlands and other waters, reductions in watersheds of area creek, the Bonnerton SNHA, and potential impacts to the Albemarle/Pamlico Estuary. I have considered the overall impacts to wetlands, both individually and cumulatively, and find that the benefits gained by these impacts outweigh the overall impacts. My decision reflects the national concern for both protection and utilization of important resources, as well as the relative extent of public and private need for the proposed work.

I have also evaluated the extent and permanence of the beneficial and/or detrimental effects of the proposed work, and on the public and private uses to which the area is suited. The proposed work will permanently impact 3,927 acres of wetlands, streams and open water. These impacts will be offset by the compensatory mitigation required as a condition of this permit to be available as impacts occur. Reduction of watersheds, also a concern, will be long-term; however, it will not be permanent, as I have required that the mined area be returned to vegetated watershed acreage during the reclamation process. Concerns have also been raised about potential water quality impacts of the proposed project, as well as impacts from cadmium levels resulting from the reclamation process. Permit conditions requiring monitoring and, if necessary, remedial action, as well as capping of the reclamation areas, should address these concerns. The benefits of the proposed work, including the utilization of the phosphate reserves found in the area, and the benefits to the economy of the general area, will last for at least the life of the mine authorized by this permit.

On balance, the total public interest would best be served by the issuance of a Department of the Army permit for Modified Alternative L. I find that the proposed project is not contrary to the public interest, and that there are no practicable alternatives that meet PCS's purpose and need that have less environmental, including wetland, impacts. The State of North Carolina has considered the potential water quality impacts of the proposed project, and has issued a conditioned Clean Water Act Section 401 Water Quality Certification for the Project.

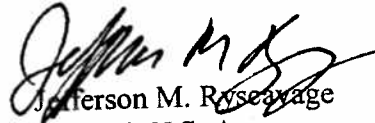
The EPA, USFWS, and NMFS have continued to express concern over this project. The EPA, in fact, elevated this permit action to the Assistant Secretary of the Army, Civil Works (ASA(CW)), pursuant to Section 404(q) of the Clean Water Act (33 U.S.C.A § 1344 (q)), and the Memorandum of Agreement (MOA) between the Corps and EPA dated August 11, 1992. Both the Department of the Interior (USFWS) and the Department of Commerce (NMFS) also have the authority to elevate permit actions to the ASA(CW); neither agency did so.

The ASA (CW) responded to EPA by letter dated May 6, 2009, concluding that the impacts I proposed to authorize are not unacceptable, in light of the proposed mitigation, reclamation, and monitoring conditions. The ASA (CW) directed me, however, to meet with EPA, the applicant, and, if interested, USFWS and NMFS, to determine if further avoidance and minimization of impacts were either practicable or otherwise agreed to by the applicant, prior to proceeding with final action on the permit decision in accordance with the MOA. I was directed to focus this effort to the headwater areas of Jacks, Jacobs and Porter Creeks, based on discussions the ASA



(CW) had with EPA. As a result of those discussions, the applicant offered to reduce impacts by 111 additional acres in areas of interest to the Federal agencies. This reduction is reflected in Modified Alternative L.

I have considered the comments of these Federal agencies, as well as State and local agencies, environmental groups, and other interested members of the public. I find that the project complies with the 404(b)(1) guidelines, 33 CFR Parts 320-327, and is not contrary to the public interest. I am therefore issuing the permit for modified Alternative L, to include the attached Special Conditions.

  
Jefferson M. Ryseavage  
Colonel, U.S. Army  
District Commander

ATTACHMENT 1 TO RECORD OF DECISION  
ACTION ID 200110096  
RESPONSE TO COMMENTS

**General Issues**

a. Practicability Considerations (Economic Analysis)

The Corps received comments on both the SDEIS and FEIS stating that the Corps' economic evaluation of alternatives is faulty. In particular, EPA, the Southern Environmental Law Center (SELC), and the Pamlico Tar River Foundation (PTRF) have attempted to identify an approach to the economic analysis of alternatives that would demonstrate that alternatives having lesser impacts than Alternative L are indeed practicable. Those comments are addressed below.

The Corps' approach to determining alternative practicability as it relates to cost was fully described in Section 2.7 of the FEIS. The concerns expressed regarding the Corps' approach and other suggested approaches were addressed either in that section or in the response to comments section of the FEIS (Appendix J). In addition to the formal comment and response process, the Corps has met numerous times with these groups and has analyzed each alternate approach recommended. The Corps has determined that the original approach using the Marston model, which amortizes major capital expenditures over the mining area for which those expenditures are necessary, is most appropriate. The Corps has also concluded that comparison of these cost estimates to an independently generated industry estimate of product value (the USGS value) is the most appropriate gauge available for determining cost practicability. Finally, the Corps has determined that alternatives that give PCS approximately 15 years of operation within the less costly Tracts (NCPC and Bonnerton) are practicable while alternatives that would require mining within the S33 Tract within the initial approximately 15 years are not practicable.

The Corps' evaluation of the cost of alternatives for the purposes of its 404(b)(1) analysis consisted of three basic steps; developing a model to predict cost, inputting data into that model, and analyzing and evaluating the results. Some comments seem to be a result of the commenter confusing the steps of the cost analysis.

**1. Marston Model v. Cash Cost Model.** The SELC commented that the Corps has not consistently applied the DEIS Marston cost model, but rather has incorporated the cash cost model into its practicability analysis. The SELC also stated that the Corps improperly claimed it used the Marston model, when it in fact used the cash cost model. I disagree with this assessment.

The Corps has been discussing the use of the Marston model for many years with PCS, members of the review team, and several economists, including Dr. Douglas Wakeman (an economist whose comments were provided to the Corps by PTRF and SELC) and economists from EPA. After the opportunity for full review of and comment on the Marston model by interested parties and their economists, and after calibrating the Marston full cost model with past costs of the PCS mine, the Corps determined that the Marston full cost method of calculating future costs is a

reasonable method to determine future costs of mining phosphate at the PCS Aurora facility. This method is presented as the basis for the Corps economic analysis in both the DEIS and the FEIS.

Following release of the DEIS, PCS submitted what it termed a "cash cost basis evaluation" using the Marston model but inputting capital and development cost on a cash cost rather than full cost basis. Specifically, those capital and development costs associated with mine relocation were placed fully in the years in which they must be expended, rather than amortized over the life of the mining those costs make possible. PCS's purpose in this presentation was, among other things, to demonstrate that by basing decisions on the seemingly lower cost in the initial years of mining in the S33 Tract, the Corps was ignoring the fact that there were substantial costs that must be incurred to move into the S33 Tract, which may not be recovered.

PCS must make major capital investments when developing a new mine area. When making the decision to proceed with these investments, PCS must look at whether these capital investments are worth making by amortizing the cost of the investment over the production that the investment makes possible; rather than by simply assessing whether or not sufficient capital is readily available. In this case, the move to S33 does not, under current market conditions, appear to be a cost effective investment of capital, because estimated cost of production in most of S33 exceeds the estimated value, based on USGS data, of the product being produced. It was that consideration that led to the development of Alternative L and the Supplement to the DEIS.

The Corps considered all comments suggesting a shift to a "cash-cost" accounting method of inputting data into the model, and ultimately determined that such a shift would not be appropriate. The basic concern that I find with this approach is that a true "cash cost" method involves placing capital expenditures fully within the years in which the money must be invested, rather than amortizing the capital investments over the years of operation for which the capital investment is required. Applying the data in this way gives an indication of when capital must be available, but does not necessarily inform the decision maker whether a capital investment will be returned in an economically viable fashion.

**2. Net Present Value.** In comments received following the release of the SDEIS and FEIS, EPA and SELC, with the assistance of Dr. Douglas Wakeman, suggested using the model with costs input in a cash cost basis, applying an NPV adjustment and then comparing the results to PCS's profits. For reasons already thoroughly addressed both here and in Section 2.7 of the FEIS, the Corps did not find the cash cost analysis or the use of profit to be appropriate. The Corps did consider the approach of applying the principles of net present value in conducting its economic analysis but ultimately decided that this approach would introduce further confusion and uncertainty into the analysis without providing any further or different information to the decision maker.

Comparing the total cost of alternatives, regardless of whether those total costs are calculated using the full cost model, the cash cost model, or whether the net present value method has been used, is not particularly useful in answering the question of whether a particular alternative is practicable. Such an analysis does not show the reality that some years can have very reasonable

costs, followed by many years of unreasonable costs. This is particularly true where the analysis covers a very long period of time.

In comments received by e-mail dated June, 25, 2008, EPA took the NPV analysis a step farther, by comparing the NPV of the annual costs for each alternative costs as calculated by the Marston cost model to the NPV of the USGS value estimates. (footnote 1)

The EPA analysis begins by calculating a "Net Present Value of Each Alt," using both a 3% and 7% discount rate. EPA also calculated the value for ore for each year, using an "ordinary least squares regression" to predict the USGS per ton prices over a 75 year period, beginning in 1991, and ending in 2065. EPA then subtracted the annual per ton cost of ore under each alternative from the predicted USGS price to determine the annual net value of that alternative. Using this method, EPA calculated the net present value of the SCRA alternative as approximately \$333.4M with a 3% discount rate, and the net present value of Alternative L as \$370.8M at 3%.

Although EPA's method of calculating the NPV of each alternative differs from Dr. Wakeman's method, the fundamental problem with both of these analyses is the same. Both Dr. Wakeman and EPA looked at these values cumulatively, generally over a period of at least 30 years. This cumulative view results in large positive numbers. What the total net present value considered by both Dr. Wakeman and EPA does not show is that when the net present value is annualized over the appropriate time periods, the total cumulative NPV remains positive because large positive numbers in the early years offset a persistent stream of negative results in the out years. This approach can work fine when used in public finance decisions where alternatives are weighed to find the one that might do the most public good. When business and industry are faced with years of negative results, however, they will most likely direct their capital into other ventures. Therefore, I consider applying this approach to private industry and expecting a private business to continue operation when faced with several years of negative value is not reasonable.

The NPV method is an important tool in evaluating major capital expenditure projects, because it provides a means of calculating the time value of money. Ideally, it allows one to compare the net cash flows of various projects as well as the amount of money in today's dollars needed to implement each project. NPV analysis is well suited for public investment evaluations, such as evaluating the economic impact of proposed regulations, as mentioned by EPA. The Corps of Engineers uses similar analysis in evaluating the economic benefit of proposed Federal water resources projects. The method is also useful in evaluating businesses with fairly constant costs. The net present value technique, however, is less valuable in analyzing economic outlook in a business such as PCS, where costs fluctuate substantially. While I accept that PCS can withstand short time periods of high costs, I do not consider it reasonable to require a private business to incur several years of unreasonable costs, even if the average of annual costs, or the total costs of an alternative that covers many years, appears to be reasonable. Discounting and calculating a net present value does not change that dynamic.

Another limitation of standard Total NPV analysis is that there is no reassessment of the company's financial standing taken into account during the period of evaluation. In other words, neither annual improvements in the company's capital situation or annual losses are factored into the decision on an updated basis. This is largely recognized as a limitation of NPV methods; that it excludes the value of real options within the investment. PCS's option of abandoning a

losing project in the future is a very real possibility that cannot be evaluated using the suggested Total NPV approach. Put more simply, the large and positive cumulative net present value of each alternative implies that all will be well; in other words, price will always exceed costs. In reality, with all alternatives, costs become unreasonably high in later years, coming within or exceeding the upper range of the USGS price or value. This is essentially the same information gained through the approach employed by the Corps and leads to the same conclusions described in Section 2.7 of the FEIS.

Regardless of the method used to calculate costs, it is clear that mining the S33 tract has much higher annual costs than mining other portions of the project area. I consider the annual cost of mining the majority of S33 to be unreasonable under current market conditions. I also consider it reasonable to consider the full cost of the move to S33 as part of the annual costs for mining the small portion of S33 where mining costs would otherwise be reasonable. Considering cost in that manner makes the cost of mining any of S33 currently unreasonable. Because I have considered an approximately 15 year time frame to be reasonable in making my assessment, I have found that an alternative must provide approximately 15 years of mining north of the S33 tract to be considered practicable. I do not believe that either the wholesale adoption of the cash cost model, or performing a net present value analysis changes my conclusion, or makes the basis of my decision clearer to the public.

b. Mitigation

Some commenters raised concern over the adequacy and appropriateness of the compensatory mitigation proposed. As compensatory mitigation for the proposed impact, PCS would provide 2:1 restoration or restoration equivalent for each acre of wetland impacted, the majority (more than 7,000 ac.) being restoration. Stream mitigation would be provided in several of the mitigation sites, and the ratio of linear feet impacted to linear feet mitigated will meet or exceed the ratios suggested in the Wilmington District's April 2003 Stream Mitigation Guidelines (1:1 for poor quality streams, 2:1 for good quality streams and 3:1 for excellent quality streams).

Within the South Creek watershed, PCS would restore approximately 3,445 acres of wetland and 3,000 linear feet of stream, enhance approximately 162 acres of wetland and preserve approximately 1,575 acres of wetland and 31,008 linear feet of stream. As further compensatory mitigation, PCS would restore approximately 885 acres of wetland and 19,783 linear feet of stream, enhance 46 acres of wetlands and preserve 41 acres of wetlands in the watershed of Pungo Creek, which flows into the Pungo River, a tributary to the Pamlico River. PCS would also restore 221 acres of wetland and 12,467 linear feet of stream, enhance 38 acres of wetlands and preserve 20 acres of wetland and 2,155 linear feet of stream within the upper watershed of 2 creeks tributary to the Pamlico River. All remaining required mitigation would come from an approximately 4,200 acre site also located in the watershed of the Pungo River and comprised of 3,342 acres of wetland and 8,793 linear feet of stream restoration, 129 acres of wetland and 7,994 linear feet of stream enhancement and 701 acres of wetland preservation.

The majority of the mitigation work would take place within the same 8-digit hydrologic unit (HUC) as the project (HUC 03020104). The only exception is a 481 acre portion of the Parker Farm, one of the South Creek watershed projects, which is located within an adjacent hydrologic