

3 **APPENDIX F: HABITAT**
4 **PROTECTION/**
5 **RESTORATION STRATEGY**

LAKE PONTCHARTRAIN BASIN RESTORATION PROGRAM

The purpose of the Lake Pontchartrain Basin Restoration Program is to restore the ecological health of the basin by developing and funding restoration projects and related scientific and public education projects to reduce the risk of pollution.

CITATION

Lake Pontchartrain Basin Restoration Program. (2025). Appendix F: Habitat Protection/Restoration Strategy. (pp. 1-21).

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Definition</u>
CCMP	Comprehensive Conservation Management Plan
CWPPRA	Coastal Wetlands Planning, Protection and Restoration Act
GOMESA	Gulf of Mexico Energy Security Act
LCA	Louisiana Coastal Area
LADOTD	Louisiana Department of Transportation and Development
LDWF	Louisiana Department of Wildlife and Fisheries
NFWF	National Fish & Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRDA	Natural Resource Damage Assessment
PRP	Lake Pontchartrain Basin Restoration Program
RESTORE Act	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
SAV	Submerged Aquatic Vegetation
SGCN	Species of Greatest Conservation Need
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

45 INTRODUCTION

46 This document was created to integrate the habitat components of the Lake Pontchartrain Basin Restoration
47 Program (PRP) Comprehensive Conservation Management Plan (CCMP) contained within the Basin
48 Characterization and Habitat chapters of the Issue Report and the habitat actions within the CCMP's Action
49 Plan chapter into a habitat restoration/protection strategy. This strategy will help guide investments of the
50 PRP as well as serve to inform actions of other programs operating in the PRP's geographic extent.

51 CCMP Purpose, Goal, and Objectives

52 The purpose of the PRP is to restore the ecological health of the Pontchartrain Basin by developing and
53 funding restoration projects and related scientific and public education projects. The habitat-specific goal of
54 the PRP aligns with that purpose: promote the sustainability of important land-based and aquatic habitat in
55 the Pontchartrain Basin. The objectives emphasize reducing wetland loss and restoring the hydrologic
56 exchanges that sustain them where possible; promoting sustainable aquatic habitats, including submerged
57 aquatic vegetation (SAV), to support diverse native flora and fauna; managing invasive species and reducing
58 their impacts on ecological health; and protecting and restoring habitat for species of greatest conservation
59 need (SGCN) and threatened natural communities. This Habitat Protection/Restoration Strategy directly
60 supports this purpose, goal, and objectives.

61 BACKGROUND INFORMATION

62 Existing Habitats

63 The Pontchartrain Basin supports a rich variety of habitats shaped by its unique hydrology, land use patterns,
64 geology, topography, and ecological history. The area within the PRP boundary spans roughly 5.5 million
65 acres, covering 16 parishes in Louisiana and four counties in Mississippi. Its boundaries are marked by the
66 Mississippi River to the west, the Amite River watershed boundary to the northwest, the Gulf of America to
67 the southeast, and the watersheds of Mississippi rivers draining into lakes Pontchartrain and Maurepas to
68 the north. The northeastern edge is delineated by the eastern watershed boundaries (HUC 8s) for the Liberty
69 Bayou and Tangipahoa subbasins. Major tributaries like the Amite, Tickfaw, and Tangipahoa rivers contribute
70 to half of the basin's drainage area.

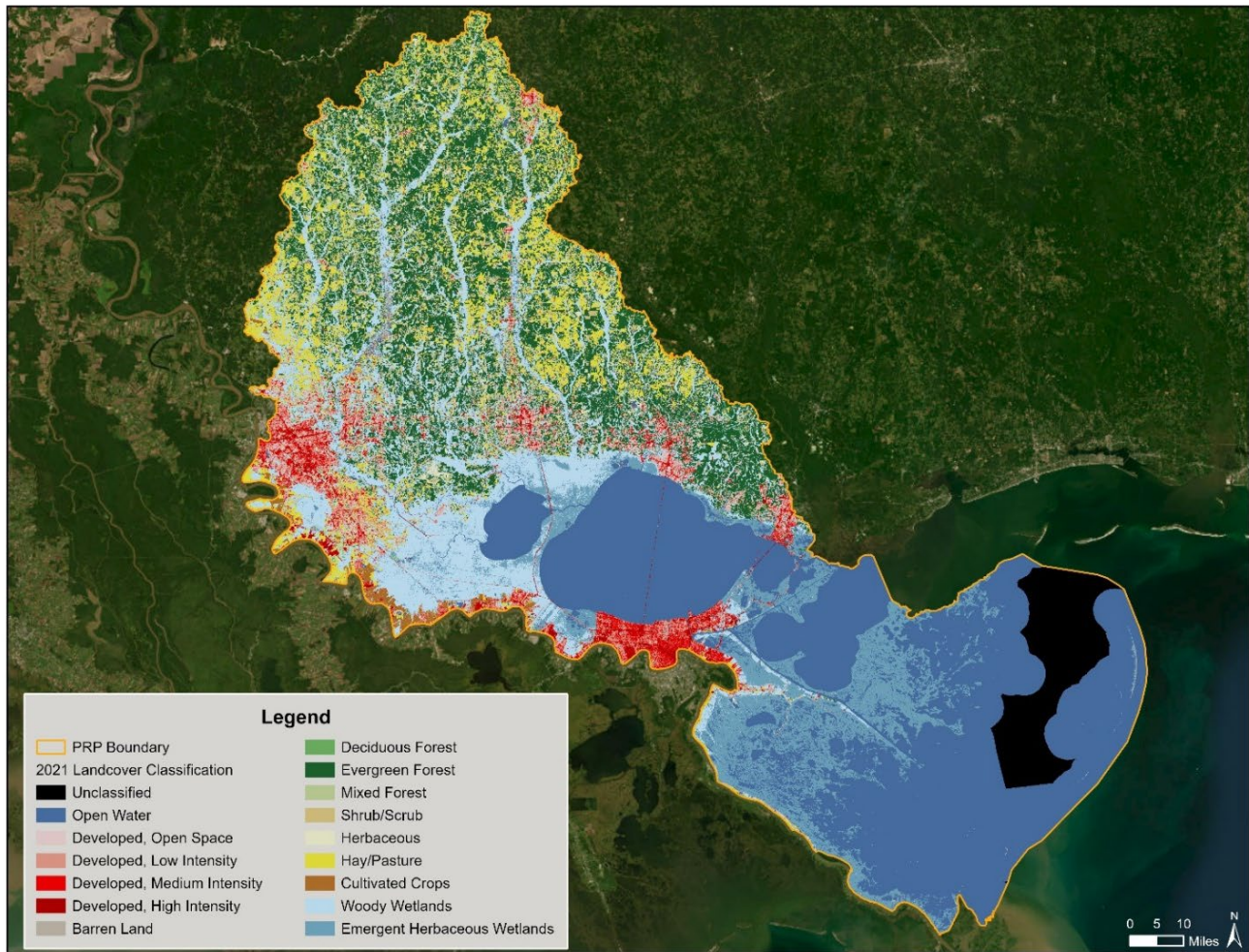
71 Ecoregions are geographic areas defined by shared environmental characteristics such as climate,
72 landforms, soils, and vegetation, which together shape similar ecosystems. The Level III ecoregions form a
73 gradient from upland forests to coastal marshes, each supporting distinct habitats. The Level III ecoregions
74 of Louisiana found within the Pontchartrain Basin are the Mississippi Alluvial Plain, Mississippi Valley Loess
75 Plain, Southern Coastal Plain, and the Southeastern Plains (Omernik & Griffith, 2014). Within each of these
76 Level III ecoregions are more detailed Level IV ecoregions, which reflect finer-scale variations in geology,
77 soils, hydrology, and vegetation (refer to the Habitat section of the Action Plan for more information). The

78 Mississippi Alluvial Plain contains meander belts, baldcypress–tupelo swamps (*Taxodium distichum* – *Nyssa*
79 spp.), and coastal marshes and barrier islands that buffer storms but are increasingly at risk from
80 subsidence and sea level rise. The Mississippi Valley Loess Plain includes rolling loess hills and terraces that
81 once held oak, hickory, and pine forests, much of which has been converted to agriculture and urban land.
82 The Southern Coastal Plain features fire-maintained longleaf pine (*Pinus palustris*) flatwoods and savannas,
83 along with productive marshes and barrier islands that sustain diverse wildlife but face rapid erosion. The
84 Southeastern Plains were historically dominated by longleaf pine woodlands interspersed with mixed forests,
85 now largely replaced by pine plantations and pasture. Together, these ecoregions illustrate a transition from
86 upland to coastal systems, highlighting both their ecological value and the challenges of habitat loss and
87 environmental change.

88 As of 2021, the Pontchartrain Basin landscape is primarily composed of open water, wetlands, forested
89 areas, and development, which together form the foundation of the basin's natural environment. Woody
90 wetlands are the most extensive habitat type, covering approximately 21 percent of the basin, with the
91 Mississippi Alluvial and Valley Loess Plains ecoregions accounting for most of this area. These wetlands are
92 primarily located around Lake Maurepas, Lake Pontchartrain, and along the Mississippi River. Evergreen
93 forests are concentrated in the northern portion of the basin and account for nearly 19 percent of the land
94 cover. Of this, 43 percent lies within the Mississippi Alluvial Plain ecoregion and 33 percent within the
95 Southeastern Plains ecoregion. Emergent herbaceous wetlands make up about 11 percent of the basin,
96 predominantly located in the southern areas, with 96 percent of this habitat within the Mississippi Alluvial
97 Plain ecoregion.

98 Open water features dominate the southern part of the basin and represent over 16 percent of the total area.
99 Within the Mississippi Alluvial Plain ecoregion, open water accounts for 41 percent of its area. Developed
100 lands comprise approximately 13 percent of the basin. High-intensity urban development, such as in Baton
101 Rouge and New Orleans, accounts for about 1 percent and is characterized by a high percentage of
102 impervious surfaces. Between 2001 and 2021, the Southeastern Plains and Southern Coastal Plains
103 ecoregions experienced the highest urban growth, with increases of 114 and 81 percent, respectively.
104 Agricultural lands, particularly for pasture and hay production, cover around 11 percent of the basin and are
105 primarily located north of Lake Pontchartrain in the Southeastern Plains ecoregion and the Mississippi Valley
106 Loess Plains ecoregion. Cultivated crops are less common, occupying less than 1 percent of the area, and
107 are mostly found in the fertile floodplains of the Mississippi Alluvial Plain ecoregion.

108 See Figure 1 for the distribution of land use land cover for 2021. For a more detailed description of the
109 current existing habitats in the basin, as well as information on the historic habitat extent and loss trends,
110 refer to the Habitat Chapter of the Issue Report.



111
112 **Figure 1. Land use land cover distribution in 2021 (Dewitz, 2023).**

113 **Habitat Issues**

114 Understanding the purpose of the PRP and the specific goal and objectives established for habitat provides
 115 context for the habitat issues presented in this section. These issues are discussed in the Issue Report, and
 116 actions have been identified to address them. One increasing concern is the recurrence of extreme weather
 117 events, which continue to reshape habitat conditions, disrupt ecological processes, and challenge restoration
 118 efforts across the basin. The primary issues discussed in the Issue Report range from long-standing challenges
 119 to newly emerging threats:

- 120 • Loss/change of coastal habitats: Coastal wetlands are threatened by sea level rise and subsidence,
 121 which reduce their elevation and disrupt the natural processes that sustain them. Although regulatory
 122 processes and mitigation banks exist to limit development-related loss, sustaining these wetlands
 123 requires restoring hydrology.
- 124 • Loss/change of inland habitats: Inland habitats across the Pontchartrain Basin are being altered by
 125 changes in hydrology, land use, and natural disturbance regimes. Many of these systems depend on
 126 specific water conditions and periodic natural events, such as seasonal flooding or fire, to maintain their
 127 ecological balance. Disruption of these processes has led to habitat degradation and reduced
 128 biodiversity.

- 129 • Impacts to species and natural communities: The Pontchartrain Basin supports many SGCN and rare
130 natural communities. Habitat degradation, fragmentation, and altered environmental conditions, such as
131 changes in salinity and temperature, threaten these species.
- 132 • Invasive species: Invasive species continue to spread across the basin, displacing native species and
133 altering habitat structure. Public awareness, community involvement, and direct control efforts are
134 needed to protect vulnerable species and habitats.
- 135 • Local policies and actions affecting and contributing to the basin's challenges: Local land use decisions
136 and development patterns can support habitat sustainability. Coordinated efforts among agencies,
137 landowners, and federal programs are essential to protect and restore critical habitats. In addition to
138 local actions, it is important to consider how changes in federal and state regulatory authorities may
139 affect protection and restoration priorities, as shifts in policy can significantly influence funding
140 availability, project scope, and long-term conservation outcomes.

141 **DEVELOPMENT OF HABITAT ACTIONS**

142 The CCMP Action Plan includes 56 habitat-specific actions. The development of actions was informed by the
143 content of the Issue Report, input from Work Groups and the Management Conference, and feedback
144 gathered through direct engagement with community members. Some of the habitat actions also emphasize
145 education and awareness, with objectives that apply across multiple habitat types and species. Each action
146 is numbered for clarity and ease of reference. These numbers, used below, correspond to entries in the
147 Habitat Action Plan table, which also contains additional details such as potential partners, timeframe, and
148 performance measures for each action.

149 **Habitat Focus Areas**

150 Habitat actions are organized around three primary focus areas that reflect the most pressing ecological
151 challenges in the Pontchartrain Basin: Coastal Habitat Change, Inland Habitat Change, and Invasive Species.
152 The following sections introduce specific habitat types within these broader categories, along with the key
153 issues they face. Natural communities associated with each habitat are also highlighted, which the Louisiana
154 Department of Wildlife and Fisheries (LDWF) uses as a framework for prioritizing protection efforts and
155 guiding research, based on groups of species that typically occur together in specific landscapes or
156 environments. Invasive species present in the system that pose threats to these habitats and the species
157 they support are also introduced. Finally, actions aimed at conserving and restoring these valuable
158 ecosystems are outlined. Some actions may serve multiple habitat types simultaneously.

159 **COASTAL HABITAT CHANGE**

160 Coastal habitats are ecosystems found along the land-sea interface, including forested wetlands, marshes,
161 barrier islands, and tidal aquatic habitat. These coastal habitats are essential for wildlife but face significant
162 threats from environmental changes and human impacts.

163 Forested Wetlands (Swamps)

- 164 • **Description:** Found in the Mississippi Alluvial Plain ecoregion, these swamps serve as a transition zone
165 from freshwater environments to brackish and saline marshes near the coast. Dominated by
166 baldcypress-tupelo gum swamp forests, they also support a variety of herbaceous plants such as
167 sedges, grasses, and rushes. The coastal live oak - hackberry forests (cheniers) natural community,
168 dominated by *Quercus virginiana* (live oak) and *Celtis laevigata* (hackberry), is found within these
169 forested wetlands.
- 170 • **Issues:** Land loss continues due to subsidence and erosion and a lack of sediment input. Decreased
171 precipitation and reduced freshwater inflow from rivers negatively impact the health of baldcypress
172 stands, which depend on low groundwater salinity levels. Additionally, extreme weather events have
173 caused alterations to these habitats.
- 174 • **Actions:**
- 175 • 2.1.3. Maintain and reconnect natural flow pathways to facilitate fish movement and/or restore degraded
176 habitats (e.g., on Bayou Sauvage National Wildlife Refuge).
- 177 2.1.13. Document and understand the effects of the River Reintroduction into Maurepas Swamp project
178 on habitats for flora and fauna and food web interactions to inform future diversion projects.
- 179 2.1.14. Explore the potential to improve the habitat of wetlands east and west of the Bonnet Carré
180 Spillway, including benefits to water quality, habitats, and the Lake Pontchartrain ecosystem.

181 Marshes and Barrier Islands

- 182 • **Description:** Found in the Southern Coastal Plain and the Mississippi Alluvial Plain ecoregions, marshes
183 include both brackish and saline marshes that lie on flat deltaic and coastal plains and are crucial for
184 wildlife habitats. Barrier islands, like the Chandeleur Islands, are remnants defined by high-energy sandy
185 bottoms composed of coarse, low-organic sediments, often associated with marine seagrass beds. The
186 coastal dune grassland natural community is found within marshes and barrier islands.
- 187 • **Issues:** Threatened by land loss from subsidence and erosion, insufficient sediment input, and other
188 natural and human-induced factors (extreme weather events, altered fire regimes, and oil spills).
- 189 • **Actions:**
- 190 • 2.1.2. Manage and maintain, in coordination with local and state agencies, a prescribed fire program for
191 herbaceous marsh habitat dominated by *Spartina patens* (fire return interval 5 years), executed by
192 Certified Prescribed Burners, to help control woody and exotic species, remove excess accumulation of
193 plant debris, and encourage growth of native vegetation.
- 194 2.1.3. Maintain and reconnect natural flow pathways to facilitate fish movement and/or restore degraded
195 habitats (e.g., on Bayou Sauvage National Wildlife Refuge).
- 196 2.1.5. Opportunistically build marsh terraces in shallow coastal lakes and in areas where they can be
197 accessed by the public to promote the growth of submerged aquatic vegetation and public awareness of
198 their role.
- 199 2.1.6. Add 'softening' adjacent to hardened shorelines (such as those with revetment or rock
200 breakwaters) to restore edge habitat.
- 201 2.1.7. Protect eroding shoreline habitats using living shorelines.
- 202 2.1.8. Protect critical landscape features within coastal wetlands to provide nesting habitat for birds,
203 including the restoration of near-shore shell berms on the edge of the Biloxi Marshes.
- 204 2.1.12. Explore increased utilization of recycled glass to support habitat restoration.

205 2.1.14. Explore the potential to improve the habitat of wetlands east and west of the Bonnet Carré
206 Spillway, including benefits to water quality, habitats, and the Lake Pontchartrain ecosystem.

207 **Tidal Aquatic Habitat (Submerged Aquatic Vegetation, Oyster Reefs)**

- 208 • **Description:** Shaped by the influence of tides, tidal aquatic habitats support diverse biological
209 communities. In the basin, these habitats include SAV and oyster reefs and are found within the
210 Mississippi Alluvial Plain ecoregion. The nature and distribution of SAV in the basin varies due to several
211 conditions. In northern Lake Pontchartrain, submersed aquatic vegetation thrives in shallow, sunlit
212 freshwater and estuarine settings, where it enhances water quality, reduces shoreline erosion, and
213 provides habitat for diverse aquatic species. The back-barrier shallows of the Chandeleur Islands
214 represent the only location in Louisiana where true marine seagrasses are found. Oyster reefs, primarily
215 formed by eastern oysters (*Crassostrea virginica*), develop on shell-rich bottoms and serve as vital hard
216 substrates for aquatic life.
- 217 • **Issues:** Erosion and land loss due to natural and human-induced factors (extreme weather events and oil
218 spills).
- 219 • **Actions:**
 - 220 2.1.4. Strategically install cultch material, broodstock reefs, and living shorelines in critical areas to
221 improve resilience for oysters.
 - 222 2.1.5. Opportunistically build marsh terraces in shallow coastal lakes and in areas where they can be
223 accessed by the public to promote the growth of submerged aquatic vegetation and public awareness of
224 their role.
 - 225 2.1.6. Add 'softening' adjacent to hardened shorelines (such as those with revetment or rock
226 breakwaters) to restore edge habitat.
 - 227 2.1.7. Protect eroding shoreline habitats using living shorelines.
 - 228 2.1.11. Identify areas where the deployment of artificial reefs could improve recreational fishing
229 opportunities.
 - 230 2.1.15. Conduct research to determine upstream source populations of submerged aquatic vegetation
231 and develop strategies for protection and conservation.

232 **Programmatic**

233 To support coastal habitat restoration, the following are programmatic actions that could be implemented:

- 234 2.1.1. Support the implementation of restoration projects approved as part of federal, state, or parish
235 planning documents that address coastal issues to increase the extent and quality of coastal habitats,
236 including in areas accessible to the public where projects can promote awareness and interest in
237 restoration.
- 238 2.1.9. Prepare a comprehensive biodiversity and environmental resource inventory including, but not
239 limited to, wildlife habitats, wetlands, floodplains, endangered species habitats, submerged aquatic
240 vegetation, and sediment sources for habitat restoration to support coastal habitat restoration and
241 management by state and federal agencies, parishes, and others.
- 242 2.1.10. Leverage available parish resources to support integration of research, monitoring, and targeted
243 studies into the implementation of habitat restoration projects to improve understanding of habitat
244 restoration effectiveness.

245 INLAND HABITAT CHANGE

246 Inland habitats are diverse ecosystems located away from coastal and marine environments that can include
247 forests, grasslands, wetlands, rivers, and upland areas. From woodlands to freshwater wetlands, many of
248 these ecosystems face growing threats from land conversion, invasive species, altered fire regimes, altered
249 hydrology, and environmental change, making their conservation and restoration important for ecological
250 resilience.

251 Forested Wetlands (Swamps and flatwoods)

- 252 • **Description:** Includes swamps found in low-relief areas with a high water table and flatwoods, which are
253 forested wetlands typically found on flat, poorly drained terrain. These habitats are found within the
254 Southern Coastal Plain, Southeastern Plains, and Mississippi Valley Loess Plain ecoregions.
255 Pondcypress-blackgum swamps, spruce pine-hardwood flatwoods, and eastern longleaf pine flatwoods
256 savanna are natural communities found within these inland wetland habitats.
- 257 • **Issues:** Swamps and flatwoods are increasingly impacted by hydrological modifications and urban
258 development, leading to a decline, while developed land cover types continue to expand.
- 259 • **Actions:**
 - 260 2.2.1. Develop and disseminate materials to educate landowners, adjacent residents, developers, local
261 decision makers, and the general public about the crucial role of prescribed burning in the management
262 of longleaf pine systems, the advantages of growing longleaf pine and associated herbaceous ground
263 cover, and promote value-added products produced from longleaf pine to encourage landowners to
264 replant longleaf pine instead of loblolly pine.
 - 265 2.2.2. Work with the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of
266 Agriculture and Forestry to provide cost-share funds to reduce or eliminate landowners' costs associated
267 with conducting prescribed burns by Certified Prescribed Burners on their property.
 - 268 2.2.3. Target areas for acquisition from willing sellers for protection (e.g., servitudes, conservation
269 easements) and stewardship implementation, including tracts that are degraded but restorable with
270 timber harvesting and prescribed fire, those in aquifer recharge zones, and those near existing
271 conservation areas to increase the extent and quality of longleaf pine habitat and other forested habitats.
 - 272 2.2.9. Improve hydrologic connectivity in swamp forests to improve water quality and reduce stagnation
273 (e.g., modifications to Highway 22 to reintroduce freshwater flows to McElroy Swamp in the lower
274 Amite).
 - 275 2.2.12. Coordinate with local governments to assess parish ordinances, development and building codes,
276 enforcement, and measures to mitigate wetland losses to encourage maximum protection of wetlands in
277 all development.

278 Riparian Wetlands

- 279 • **Description:** Found within the Southern Coastal Plain, Southeastern Plains, and Mississippi Valley Loess
280 Plain ecoregions, these areas include riparian habitats and floodplains along rivers and streams that
281 periodically flood. Eastern hillside seepage bog is a natural community found within this inland wetland
282 habitat.
- 283 • **Issues:** Riparian areas are affected by unvegetated sand and gravel deposits, widened channels, reduced
284 sinuosity, and ongoing erosion, aggradation, and habitat degradation.
- 285 • **Actions:**

- 286 2.2.4. Develop a comprehensive stream survey methodology for the Pontchartrain Basin, building on
 287 existing approaches and best practices, to ensure consistent documentation of geomorphic and habitat
 288 characteristics and the presence of species of greatest conservation need (e.g., freshwater mussels).
 289 2.2.5. Promote the value of instream, riparian, and floodplain habitat, and its compatibility with flood
 290 storage and conveyance by developing and disseminating outreach materials (e.g., on the importance of
 291 adhering to no wake zones).
 292 2.2.6. Conduct a basin wide evaluation of unutilized gravel mines including an assessment of the overall
 293 environmental impact and existing conditions, historical vegetation and hydrologic connectivity, surface
 294 elevations of the site, and whether any old or hazardous equipment remains on-site to support gravel pit
 295 restoration.
 296 2.2.7. Restore the natural channel and floodplain function within unstable reaches of the Upper Amite
 297 River in the vicinity of sand and gravel operations to improve habitat and reduce flood risk and
 298 downstream sediment loads.
 299 2.2.8. Preserve the existing undeveloped, natural floodplain along Bayou Fountain and Bayou Manchac to
 300 prevent development and preserve floodplain storage to reduce flood risk.
 301 2.2.12. Coordinate with local governments to assess parish ordinances, development and building codes,
 302 enforcement, and measures to mitigate wetland losses to encourage maximum protection of wetlands in
 303 all development.
 304 2.2.15. Provide financial incentives to private landowners to maintain existing riparian areas on private
 305 lands or to allow riparian habitat to naturally establish and be retained on sites associated with the
 306 drainages in the Pontchartrain Basin.

307 Upland Forests and Savannas

- 308 • **Description:** Once dominated by longleaf pine savannas that supported species such as the gopher
 309 tortoise (*Gopherus polyphemus*) and red-cockaded woodpecker (*Dryobates borealis*), these ecosystems
 310 have largely been replaced by mixed forests of loblolly (*Pinus taeda*) and slash pine (*Pinus elliottii*),
 311 particularly in wetter areas. Upland habitats also include hardwood forests of cherrybark oak (*Quercus*
 312 *pagoda*) and swamp chestnut oak (*Quercus michauxii*), pine-oak forests with shortleaf (*Pinus echinata*)
 313 and loblolly pine alongside white (*Quercus alba*) and live oak. Upland forests and savannas are found
 314 within the Southern Coastal Plain and the Southeastern Plains ecoregions. Eastern upland longleaf pine
 315 woodland and shortleaf pine/oak-hickory woodlands are natural communities within these inland upland
 316 habitats.
- 317 • **Issues:** Significant loss of longleaf pine savannas has been due to conversion to pine plantations, mixed
 318 pine forests, pasture, and urban developments. Loss is compounded by land fragmentation, rapid
 319 urbanization, exclusion of natural fire regimes, introduction of non-native and invasive species.
- 320 • **Actions:**
 - 321 2.2.1. Develop and disseminate materials to educate landowners, adjacent residents, developers, local
 322 decision makers, and the general public about the crucial role of prescribed burning in the management
 323 of longleaf pine systems, the advantages of growing longleaf pine and associated herbaceous ground
 324 cover, and promote value-added products produced from longleaf pine to encourage landowners to
 325 replant longleaf pine instead of loblolly pine.
 - 326 2.2.2. Work with the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of
 327 Agriculture and Forestry to provide cost-share funds to reduce or eliminate landowners' costs associated
 328 with conducting prescribed burns by Certified Prescribed Burners on their property.

329 2.2.3. Target areas for acquisition from willing sellers for protection (e.g., servitudes, conservation
330 easements) and stewardship implementation, including tracts that are degraded but restorable with
331 timber harvesting and prescribed fire, those in aquifer recharge zones, and those near existing
332 conservation areas to increase the extent and quality of longleaf pine habitat and other forested habitats.

333 Programmatic

334 To advance restoration efforts in all inland habitats, the following programmatic actions could be considered
335 for implementation:

336 2.2.10. Identify priority areas for conservation, including those suitable as mitigation banks, and work
337 with landowners to develop appropriate conservation strategies to sustain natural communities and
338 provide habitat for species of greatest conservation need.

339 2.2.11. Draft model ordinance amendments to ensure the protection of floodplains, wetlands, forested
340 areas, natural communities, and other environmentally sensitive resource areas by addressing open
341 space dedication standards (e.g., requiring that at least 50% of the total floodplain area within any new
342 large residential development must be preserved as open space) ensuring the maintenance of wildlife
343 habitats, the retention of natural floodwater storage, and groundwater recharge.

344 2.2.13. Foster the use of green infrastructure on public Rights of Way and public spaces (e.g., tree
345 plantings) to improve habitat for native flora and fauna, promote water quality, and reduce nuisance
346 flooding.

347 2.2.14. Compile a list of resource materials to help landowners identify and apply for funding from
348 federal programs (e.g., through the Farm Bill) that support habitat conservation on private lands.

349 2.2.16. Identify funding sources to support best management practices on working lands to improve
350 habitat and offset costs to agriculture.

351 INVASIVE SPECIES

352 Habitats of the Pontchartrain Basin are subject to threat from invasive flora and fauna. Invasive species are
353 non-native organisms that cause ecological or economic harm in the environments they invade (National
354 Oceanic and Atmospheric Administration (NOAA), 2024). In the Pontchartrain Basin, both invasive plants and
355 animals pose serious threats to native habitats and species, including those classified as SGCN. Many
356 invasive species are present throughout the basin; the examples discussed here do not represent a
357 comprehensive list. For a more detailed overview of invasive species in the Pontchartrain Basin and their
358 impacts, please refer to the Issue Report.

359 Flora

- 360 • **Description:** Invasive plants pose significant threats to ecosystems, like savannas and SAVs, by
361 outcompeting native species, reducing biodiversity, and altering natural functions. In the basin, several
362 invasive species are of particular concern.
- 363 • **Issues:** Cogon grass (*Imperata cylindrica*) spreads rapidly, necessitating early detection, effective control
364 methods, and understanding of habitat recovery to mitigate its impact on native ecosystems. Chinese
365 tallow (*Triadica sebifera*) trees invade grasslands and dredged material banks, reducing biodiversity,
366 altering ecosystem functions, and outcompeting native species. Additionally, water hyacinth (*Eichhornia*

- 367 *crassipes*) presents challenges as current herbicides may not be effective or cost-efficient, and the long-
368 term effectiveness of biological control agents is not well understood, necessitating new solutions.
- 369 • **Actions:**
 - 370 2.3.7. Conduct monitoring to better understand the role of invasive species in submerged aquatic
371 vegetation change.
 - 372 2.3.8. Identify and pursue administrative and/or legislative changes to enable private landowners to
373 control invasive flora without violating wetland regulations.
 - 374 2.3.9. Explore the potential for composting of invasive plant material to avoid potential on-site issues,
375 (e.g., related to water quality), reduce landfill demands, and promote awareness.
 - 376 2.3.19. Conduct training on invasive species identification and encourage diligent cleaning of highway
377 mowing equipment after use to prevent the spread of cogon grass.
 - 378 2.3.20. Conduct field surveys (e.g., ground surveys, remote sensing, drones) to enable timely detection of
379 new occurrences of cogon grass, especially those outside the known range of cogon grass, and provide
380 financial incentives to conduct intensive control.
 - 381 2.3.21. Support additional research on the control of cogon grass including documentation of habitat
382 recovery where control efforts have been implemented to support effective control efforts.
 - 383 2.3.22. Encourage use of prescribed fire by Certified Prescribed Burners in rangeland and pasture
384 management to limit recruitment of Chinese tallow trees in grassland habitats and promote native
385 species.
 - 386 2.3.23. Prevent the spread of Chinese tallow trees and support native species by opportunistically
387 degrading banks of dredged material associated with canals and infrastructure construction within
388 wetlands.
 - 389 2.3.24. Conduct research on new herbicides for water hyacinth and giant salvinia to determine the
390 efficacy and cost effectiveness versus current options.
 - 391 2.3.25. Support research into the long-term effectiveness of biological control agents for water hyacinth
392 and giant salvinia to improve understanding and promote the use of such control when appropriate.

393 **Fauna**

- 394 • **Description:** Invasive animal species are increasingly threatening the ecological integrity and biodiversity
395 of the basin. These non-native animals disrupt natural food webs, degrade habitats, and outcompete or
396 prey on native wildlife. Their presence can lead to long-term environmental damage and public health
397 concerns.
- 398 • **Issues:** Invasive apple snails (*Pomacea maculata*) destroy native wetland vegetation, disrupt aquatic
399 ecosystems, and spread dangerous parasites and neurotoxins that can harm both humans and animals.
400 Carps disrupt freshwater ecosystems by outcompeting native fish for food, destroying aquatic
401 vegetation, and threatening endangered species like freshwater mussels, posing an ecological and
402 economic threat if not urgently controlled. Feral hogs (*Sus scrofa*) harm ecosystems by damaging
403 vegetation, increasing soil erosion, altering ecological dynamics, and preying on birds and reptiles. They
404 also spread diseases and bacteria, impacting water quality and biodiversity.
- 405 • **Actions:**
 - 406 2.3.10. Support programs to address apple snail populations through application of Federal Insecticide,
407 Fungicide, and Rodenticide Act-approved pesticides or coordination through Louisiana Department of
408 Agriculture and Forestry for experimental use permits in the use of other chemical applications (such as
409 chelated copper) in addition to concurrent intensive manual collection of eggs and adults.
 - 410 2.3.11. Develop effective trapping techniques for apple snails to improve control.

- 411 2.3.12. Engage local stakeholders in documentation of apple snail occurrence and active control of egg
412 masses to limit distribution and abundance.
- 413 2.3.13. Develop a program to introduce redear sunfish to retention ponds, ditches, and public water
414 bodies to control juvenile apple snails.
- 415 2.3.14. Develop passive trapping methods to aid in reduction of Asian carp abundance, possibly by using
416 the jumping behavior of some species to assist in low by-catch trapping or by targeting areas of dense
417 concentrations.
- 418 2.3.15. Assess the success of management methods for Asian carp being used on other parts of the
419 Mississippi River Basin and evaluate their potential applicability to the Pontchartrain Basin.
- 420 2.3.16. Support research on swine-specific toxicants and immuno-contraceptives to control feral hog
421 populations.
- 422 2.3.17. Educate the public on disease transmission, zoonotic diseases, and the detriments of intentional
423 translocation of feral hogs to limit spread.
- 424 2.3.18. Promote hunting, trapping, and snaring, and explore the potential for a bounty program to provide
425 financial incentives to increase control of feral hog populations.

426 **Programmatic**

427 Public awareness and participation are essential components of invasive species management. A range of
428 educational actions focus on informing and empowering communities. These include:

- 429 2.3.1. Educate the public on the impact of invasive species in the basin to prevent inadvertent
430 introductions.
- 431 2.3.2. Provide guides to identify invasive species to educate the public and those working outdoors on
432 how they may be differentiated from similar native species
- 433 2.3.3. Release (or encourage/assist in the development of) public service announcements on the
434 impacts of invasive species on the human environment and recommend actions people can take to
435 prevent the spread of invasive species.
- 436 2.3.4. Encourage the posting of educational signage at major boat ramps recommending efforts be
437 undertaken to ensure exotic plants on boats and trailers are removed prior to placing potentially infested
438 boats or trailers into the water.
- 439 2.3.5. Work with Louisiana Master Naturalists, Louisiana Department of Wildlife and Fisheries, and other
440 local organizations to conduct education and training programs for governments employees, develop
441 rapid response approaches for new invasions, and coordinate volunteer events focused on invasive
442 species removal.
- 443 2.3.6. Promote the utilization of federal cost-share programs (e.g., Natural Resource Conservation
444 Service Farm Bill programs, U.S. Department of Agriculture Animal and Plant Health Inspection Service)
445 to address invasive species problems.

446 **RESTORATION IMPLEMENTATION PROGRAMS**

447 The PRP aims to restore the basin's ecological health by funding restoration projects and related scientific
448 and public education initiatives. The actions in the CCMP will require funding beyond what is currently
449 available through PRP. Other implementation programs that could support restoration efforts in the
450 Pontchartrain Basin are provided in Table 1 though this is not an exhaustive list.

451 **Table 1. Possible funding sources for habitat restoration actions.**

CATEGORY	PROGRAM	DESCRIPTION
Federal	U.S. Fish and Wildlife Service (USFWS) Habitat Restoration Program	Provides technical and financial assistance to restore and manage wetland, forest, and upland habitats.
Federal	USFWS National Coastal Wetlands Grants Program	Offers grants up to \$1 million to protect, restore, and enhance coastal wetland ecosystems.
Federal	NOAA Coastal and Marine Habitat Restoration Project Grants	Supports habitat restoration projects to rebuild fisheries, conserve protected resources, and promote healthy ecosystems.
Federal	NOAA Broad Agency Announcement	Encourages research, education, outreach, and innovative projects not addressed through NOAA's competitive discretionary programs.
Federal	NOAA Coastal Resilience Grants	Funds projects to enhance fish and wildlife habitat and protect coastal communities through natural infrastructure.
Federal	U.S. Forest Service (USFS) Stewardship funding	Connects private landowners with resources to manage forests and woodlands for various benefits.
Federal	U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Conservation Programs	Offers financial and technical assistance to address natural resource concerns and deliver environmental benefits.
Federal	U.S. Army Corps of Engineers (USACE) Civil Works budget	Supports water resources development, management, and restoration through various appropriations.
Federal	USACE Continuing Authorities Program, Section 1135	Enables the USACE to partner with nonfederal sponsors to modify existing water resource projects for environmental restoration and improvement.
Federal	Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)	Funds the design and construction of coastal wetlands restoration projects in Louisiana.
Federal	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE Act)	Dedicates 80% of penalties from <i>Deepwater Horizon</i> spill to restoration efforts.
Federal	Gulf of Mexico Energy Security Act (GOMESA)	Provides revenues from Outer Continental Shelf activities to Gulf Coast states.
Federal	Deepwater Horizon related funding sources (including NRDA)	Funds from Deepwater Horizon spill for natural resource damage assessment.
State	Louisiana Coastal Area (LCA)	State initiative for coastal restoration and protection.

CATEGORY	PROGRAM	DESCRIPTION
State	Louisiana Department of Agriculture and Forestry (LDAF)	Grants for farming, forestry, and business recovery; no-cost program for treatment of small cogon grass patches on private property and roadsides.
State	Louisiana Department of Transportation and Development (LADOTD)	Various enhancement programs.
Other	Regional Conservation Partnership Program	Funds projects like AR-LA Conservation Delivery Network Open Pine Landscape Restoration.
Other	Louisiana Sea Grant	Funding for research, extension, and education needs.
Other	National Fish and Wildlife Foundation (NFWF) Gulf Environmental Benefit Fund	Funds projects benefiting Gulf Coast ecosystems.
Other	The Conservation Fund	Supports habitat restoration projects through partnerships and funding

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