The Planning Process

- The Comprehensive Conservation Planning Process
- Issues, Concerns, and Opportunities
The Comprehensive Conservation Planning Process

Service planning policy (602 FW 3) establishes an eight-step planning process that also facilitates our compliance with NEPA (figure 2.1). Our planning policy and CCP training course materials describe those steps in detail. We followed this process in developing the draft CCP/EA document and this final CCP. Although the steps are described sequentially, the CCP planning and NEPA processes are iterative. It is normal to cycle through some steps more than once or to have several steps occurring simultaneously. For more information on the CCP planning process, visit the Web site: http://policy.fws.gov/602fw3.html (accessed June 2011).

Figure 2.1. The Comprehensive Conservation Planning Process
The Comprehensive Conservation Planning Process

In 2006, we began developing a CCP for Mason Neck and Featherstone Refuges by collecting information on both the refuges’ resources and initiating scoping efforts to identify issues, concerns, and opportunities to address in the CCP. We took the following actions to complete CCP planning steps A-F:

■ Held first CCP core team meeting in September 2006; drafted a vision statement and identified preliminary issues.

■ Distributed separate planning newsletters for Mason Neck and Featherstone Refuges in March 2007 to announce the kick-off of the CCP, notify the public about the public scoping open house meetings, and share draft vision and goals statements.

■ Held an open house on March 27, 2007 primarily focused on Featherstone Refuge at the Potomac Community Library in Woodbridge, Virginia.

■ Held an open house on March 28, 2007 primarily focused on Mason Neck Refuge at Gunston Elementary School in Lorton, Virginia.

■ Held a CCP core team meeting on March 29, 2007 to discuss the comments made at the scoping meetings, to further define key issues, and to develop a draft CCP schedule.


■ Published a Notice of Intent (NOI) in the Federal Register on May 18, 2007 (72 FR 28066).

■ Held a series of CCP core team meetings to develop alternatives from March–October 2007.

■ Distributed a planning newsletter in November 2007 summarizing public scoping comments and describing the Visitor Services Program Review and Biological Program Station Evaluation.

■ Evaluated Service fee-owned lands on the refuges for their possible inclusion into the National Wilderness Preservation System. We completed that evaluation in January 2008 with the recommendation that no lands on either refuge qualified and that we not proceed with a wilderness study. Appendix D in the draft CCP/EA shows the results of this evaluation.

Eligibility criteria for use by Federal agencies to evaluate rivers’ potential for Federal Wild and Scenic River status. We completed that evaluation in January 2008. Although the Potomac River borders Mason Neck Refuge, it is not included within the refuge boundary. Mason Neck Refuge also borders Belmont and Occoquan Bays whose waters are under the jurisdiction of the Commonwealth of Virginia. Featherstone Refuge borders Occoquan Bay and Neabsco Creek. No other river or river segments lie within the refuges.

Eligibility criteria for use by Federal agencies to evaluate rivers’ potential for Wild and Scenic designation are recommended by the National Park Service (NPS) and include consideration of outstanding remarkable values for scenery, recreation, geology, or history. We consulted the National Rivers
Inventory database maintained by the National Park Service which documents rivers and river segments that have been evaluated (http://www.nps.gov/ncrc/programs/rtca/nri/; accessed June 2011). Several segments of the Potomac River are identified as potentially eligible. The closest is the 24-mile segment from Nice Memorial Bridge in Charles County, Maryland to Sandy Point in Prince Georges County, Maryland. None of this segment occurs on refuge lands. While we would consider being a part of a more detailed evaluation of the Potomac River in proximity to the Refuge Complex, undertaking its full evaluation is outside the scope of our planning process and we have determined there was no need to initiate further analysis.

- Analyzed management alternatives and wrote a draft CCP/EA from January 2008–September 2010.
- Published a Notice of Availability (NOA) in the Federal Register on January 5, 2011 (76 FR 582). That notice announced the release of the draft CCP/EA document for a 49-day public review and comment from January 5, 2011 to February 22, 2011.
- Distributed the draft CCP/EA to all interested parties, contacted the media, and posted it on our Web site during the January–February 2011 comment period.
- Reviewed and summarized all comments received and wrote responses during March-May 2011. Our response to public comments is in appendix G.
- Submitted the final plan to our Regional Director for review in August 2011. The Acting Regional Director determined a FONSI was warranted (see appendix H), and that our analysis was sufficient to simultaneously issue a decision adopting this CCP for the refuges.
- We will announce the final decision by publishing a Notice of Availability in the Federal Register, where we will also notify people of the availability of the final CCP. We will also distribute a newsletter announcing his decision to all contacts on our project list, as well as post that newsletter on our Web site. These actions will complete “Step F: Prepare and Adopt a Final Plan.”

We can then begin “Step G: Implement Plan, Monitor and Evaluate.” We will modify the CCP as warranted following the procedures in Service policy (602 FW 1, 3, and 4) and NEPA requirements as part of “Step H: Review and Revise Plan.” Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an environmental action memorandum. As the Refuge Improvement Act and Service policy stipulate, we will review and revise CCP’s at least every 15 years.

We define issues and concerns as “any unsettled matter requiring a management decision.” Issues need not be negative, and can also include opportunities. According to Service policy (602 FWS 1.6), an issue can be an

- initiative;
- opportunity;
- resource management problem;
- threat to a resources;
- conflict in use; or
- a public concern.
Issues, concerns, and opportunities arise from many sources, including our staff, other Service programs, State agencies, other Federal agencies, our partners, neighbors, user groups, or Congress. One of the distinctions among the proposed management alternatives is how each addresses those issues, concerns, and opportunities. The following summary provides a context for the issues that arose during the scoping process.

Based on core team discussions, Federal and State agency scoping, and public scoping, we compiled the following set of issues, concerns, and opportunities to address under our various management objectives in chapter 4.

Maintaining a Biological Program
Establishing a quality biological program is core to the mission of the Refuge System. The Refuge Improvement Act emphasizes that “wildlife come first” on refuges. Unfortunately, due to budget and staffing changes, the Refuge Complex has been without a wildlife biologist for several years. This has hampered the current staff’s ability to develop a strategic plan for its biological program.

- **Staff Biologist**—If we are to have a viable biological program in the long term, should hiring a wildlife biologist be a high priority for the Refuge Complex?

- **Management Assistance**—How can we best cooperate with VDGIF, other State agencies, conservation partners, and volunteers for assistance with biological inventory, monitoring, and management, and/or other aspects of the biological program?

Bald Eagle Management
With a reduction in pollution, greater awareness, and better national and regional protection for populations and their habitat, the bald eagle has made a recovery. In 2007, the bald eagle was officially de-listed under the Federal Endangered Species Act. However, the bald eagle remains one of our priority management concerns because the refuge was originally established for bald eagle conservation and the species remains State-listed as threatened in Virginia.

- **Eagle Nest Tree Protection**—Although the bald eagle nest trees currently benefit from the breakwater project (see shoreline erosion below), how can we ensure continued long-term protection?

- **Preventing Disturbance to Nesting Eagles**—Trail restrictions should continue to be posted to protect active nest trees each year. Should those restrictions change in any way?

- **Future Roost and Nest Trees**—What, if any, site improvements can we make for eagles to ensure there is a sustainable and adequate stock of trees suitable for nesting and roosting? Should this be a major focus of our forest management?

Forest Management
Forest habitat accounts for most of the acres on the refuge. Protecting the diversity, integrity, and health of those forests is fundamental to our mission. We are concerned about many existing and potential threats to this habitat, including deer overbrowsing, pests and pathogens, invasive plants, and climate change. In 2009, the Virginia Department of Forestry (VDF) conducted a Forest Health and Condition Inventory and Assessment for Mason Neck Refuge. Overall, they found that the forest as a whole was not healthy (VDF, 2009). The forest was determined to be overstocked, lacking significant tree regeneration, and missing a shrub and herbaceous layer. The major concerns with these conditions are:
stressed trees are less able to fend off disease and pests, the lack of regeneration would mean the forest cannot replace itself once trees die, and the lack of shrub and herbaceous understory means degraded habitat conditions for many forest dwelling species.

- **Forest Health**—How can we effectively implement the VDF’s recommendations, as presented in their Forest Health and Condition Inventory and Assessment, to help meet our forest health objectives? Which ones should be a priority?

- **Deer Impacts on Forest**—The forest habitat on the refuge appears to be recovering from its previously overbrowsed condition due to reductions in the deer herd from managed hunts. How can we ensure overbrowsing does not occur again?

- **Deer Management Coordination**—White-tailed deer (*Odocoileus virginianus*) are a problem across the Mason Neck Peninsula, and it will take a coordinated effort among agencies to make any more significant improvement in habitats. How can we best continue to play a principal role in that collaborative effort?

- **Deer Exclosures**—Currently there are about 20 deer exclosures on the refuge, each showing differences in vegetation growth and forest floor diversity. These exclosures have not been monitored in the last several years, but many are in disrepair. What should be done with the deer exclosures?
  - Is the Bureau Land Management (BLM) still interested in using some at the Meadowood Recreation Area?
  - Is there an interpretation message about deer overbrowsing that could be facilitated at one of the exclosures visible location alongside a trail? The exclosure beside the Great Marsh Trail is in good condition and a possibility. Is this a good use of refuge staff and resources?

- **Vernal Pools**—What can we do to further protect and promote vernal pools on the refuge?

**Heron Rookery**
The great blue heron rookery on Mason Neck Refuge was once one of the largest in the Mid-Atlantic region with over 1,600 nests at its peak. It now supports approximately 800 nests. The reasons for this reduction are not entirely clear.

- What are the threats to the rookery on Mason Neck Refuge? What steps could we take to address the threats?

- Can the rookery be maintained on the refuge, or on other protected lands in the area?

**Wetlands—Little Marsh Impoundment**
Little Marsh Impoundment (50 acres) is a heavily used foraging area for bald eagles and herons. It is partially drained in June and July so that fledgling herons and eagles have better access to food. We need to determine how best to address a number of management issues here.

- The Little Marsh wetland is shallow and becoming increasingly filled in with sediment, allowing emergent woody vegetation to encroach. How can we create a greater diversity of emergent marsh vegetation to better support wetland wildlife species?
Issues, Concerns, and Opportunities

- In the past, large storms have overtopped the dike threatening to damage or wash it out. How can we address the integrity of the dike?

- The water control structure continues to be damaged and disrupted by beavers (*Castor canadensis*). How can we address the integrity of the water control structure?

Wetlands–Great Marsh

Great Marsh (207 acres) is one of the largest freshwater marshes in northern Virginia. It is a significant habitat on the refuge, and we consider its protection a priority. The marsh contains extensive stands of wild rice and provides habitat for a variety of species including waterfowl and waterbirds.

- How do we best determine what steps are needed to maintain its integrity and be proactive about certain issues, such as the following:
  - Is water quality adversely affecting the marsh?
  - How do we continue to deal with tide and storm-deposited trash?
  - How do we best prevent invasive plants from taking hold in the marsh?

Other Wetlands

- What management practices are best for waters currently impounded on refuge streams, such as the Little Marsh Road impoundment (approximately 4 acres)?

- Can waterfowl or waterbirds benefit from these smaller impoundments?

Climate Change

Climate change is an issue of increasing concern because of its potential effects on land, water, and biological resources. In addition to warming temperatures, other predicted climate-related changes include changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, decreasing range of nighttime versus daytime temperatures, increasing water temperatures, and increasing frequency and intensity of severe weather events (TWS, 2004). Each of these changes would affect wildlife and habitats, but the level of impact would vary depending on the species.

Virginia’s WAP identifies more than 900 species that are being impacted by the loss or degradation of their habitats. Many of these species could become extinct or extirpated from Virginia if steps are not taken to reverse these trends. In coming decades, climate change would exacerbate and intensify many of the existing threats and would likely result in new sets of impacts and stressors. In 2009, VDGIF and the Virginia Conservation Network (VCN) produced Virginia’s “Strategy for Safeguarding Species of Greatest Conservation Need from the Effects of Climate Change” to provide initial guidance on actions Virginia’s conservation community can implement immediately to enhance the conservation of wildlife and habitats in the face of climate change while more comprehensive adaptation strategies are developed (VDGIF et al., 2009).

Conservation strategies include specific actions for conserving species and habitats, developing new data and climate modeling resources, and implementing new outreach efforts related to climate change (VDGIF et al., 2009; http://bewildvirginia.org/climate-change; [accessed June 2011]).
How can we use adaptive management on the refuge to address the predicted climate change impacts? Are there specific actions we can take to reduce environmental stressors on wildlife and habitats? Are there particular species or ecological communities that should be a priority to address?

Is there additional research, impacts modeling, monitoring and inventories we should initiate to serve as a baseline for measuring change and/or predicting impacts?

Shoreline Protection
Shoreline erosion is an existing problem that would be exacerbated with predicted climate change impacts. Erosion is occurring along the entire refuge shoreline, but is most visible along the bluffs. Maintaining a stable shoreline is critical to sustaining the integrity of the refuge and its resources. However, shoreline stabilization can be very complex and expensive and would include coordination with several partners.

How can we best accomplish additional shoreline protection? Breakwaters have been successful in stopping and reversing erosion trends along the southwest bluffs near the heron rookery. Should this technique be used in other locations?

Is using fill another feasible and practicable way to stabilize the shoreline? Could we use dredge spoil as a source of material for fill?

Are there other shoreline stabilization measures we should explore, such as “living shoreline” options?

Are there partners with expertise willing to assist us in the design, implementation, and monitoring of stabilization projects?

What are potential funding sources for these projects?

Invasive Plants
Japanese stiltgrass (*Microstegium vimineum*) is the most problematic invasive plant on Mason Neck Refuge. However, there are several other invasive plants that may pose problems in the future. Other invasive species present on the refuge include mile-a-minute (*Polygonum perfoliatum*), tree of heaven (*Ailanthus altissima*), Japanese honeysuckle (*Lonicera japonica*), Japanese barberry (*Berberis thunbergii*) and beefsteak plant (*Perilla frutescens*).

How can we best control the increasing invasive species problem?

How do we prioritize treatment?

Invasive Animals/Insects
Emerald ash borer (*Agrilus planipennis*) and gypsy moth (*Lymantria dispar*) are pests recorded on the refuge, and while not currently a problem, they could become one without vigilant monitoring and control where warranted.

How can we ensure we are prepared to deal with animal and insect pests in the future?

National Historic Preservation Sites and their Protection
Recent studies identified archaeological sites along the shoreline that are jeopardized by erosion. We need to verify whether or not these sites are eligible for the National Register of Historic Places. We are also concerned about the protection of historical sites. Although we are uncertain of the presence of any important sites, the Mason family was settled on the peninsula for several generations.
Issues, Concerns, and Opportunities

- How can we protect the integrity of any sites known or eligible for the National Register of Historic Places?
- Are there issues with public access to these sites? Can we expand refuge uses and still effectively protect these resources?

Public Use and Demands
Mason Neck Refuge is located within driving distance of approximately 10 million residents of Virginia, Maryland, and Washington, D.C. The current estimate of 19,100 refuge visitors annually is likely to increase over the next 15 years. Such an increase is especially likely if refuge facilities are expanded or improved, and/or promoting recreational opportunities across Mason Neck Peninsula increases. On the Mason Neck Peninsula alone, public agencies manage lands that include the refuge, the Meadowoods, Mason Neck State Park, Gunston Hall Plantation, and Pohick Bay Regional Park.

Together, in an informal association referred to as “Mason Neck Managers Group,” representatives of these Federal, State, and regional government land management agencies share resources and attempt to minimize duplication of effort by coordinating recreational activities. This allows each agency to focus on its strengths, such as general recreation, outdoor or wildlife dependent recreation, resource protection, or historical interpretation. Collectively, the coordination among public land managers on Mason Neck ensures that the public has the opportunity to enjoy a variety of activities without diminishing the purposes for which each area was created. One priority of the association is to collaboratively and jointly manage in anticipation of a predicted increase in area visitation.

The refuge presently accommodates five out of the six priority public uses. Wildlife observation, nature photography, environmental education, interpretation, and hunting, all occur at some level on the refuge, although demand may not always be met. The only priority public use not allowed on the refuge is recreational fishing. This is an issue that has been raised by the public. It is not allowed because no opportunities are present in areas open to public access. For example, virtually all of the refuge shoreline (and thus, potential fishing sites) are closed to public access due to concerns with wildlife disturbance or impacts to sensitive habitat areas. In this CCP, the fishing closure is maintained and we continue to direct people to the adjacent State Park for fishing.

The major issues we need to address concerning public uses at Mason Neck Refuge include the following:

- How can we accommodate increased public demand for additional access on the refuge, primarily more walking trails, while not jeopardizing sensitive wildlife and habitat areas?
- How do we effectively explain the decision to allow certain activities on the multi-use High Point Trail, where it runs through the refuge, while not allowing some of those same activities on refuge trails?
- How can we best coordinate with Mason Neck State Park, which has well established set of trails that should factor into decisions about an overall trail system?
- How can we best provide trail connections, taking into account distances and parking areas?
Issues, Concerns, and Opportunities

■ How do we accommodate the public desire for more and better access, yet not complicate law enforcement? We have had several instances where vehicles are locked-in behind the gate after hours. Is there a better system? Should we change the gate type to one which opens from the inside after hours, so no one can get locked in? Is the best location on State Park lands? What is the level of coordination that will be required with State Park enforcement of trailheads and parking lots?

■ Is there a potential to develop a new trail along a current refuge road (e.g., Sycamore Road), which leads to a viewpoint on the Potomac River? How do we avoid impacting the private residences along that road?

■ Could we link the trail to the road and avoid the residential backyards issue by using the first loop of the Woodmarsh Trail as a connector to a Sycamore Road trail?

■ Would this impact any archaeological/historical sites?

■ The bottom two loops of Woodmarsh Trail are closed December to July to protect nesting eagles so we do not want to open up those areas to public use. How do we integrate that closure into an expanded trails plan?

■ Could we create a trail to provide access to Little Marsh? A new Little Marsh trail would access a different habitat type than current refuge and State Park trails because Little Marsh is nontidal freshwater; the water control structure does not allow tidal influence. Access must be through a controlled road.

■ Other issues on trails and trail creation include the following:

* Can we use existing road surfacing for road-to-trail conversions?

* The State Park is conceptualizing (no final plans yet) a trail from the primitive campground, out towards Sandy Point, up to High Point Road. How can we best integrate any new or expanded refuge trails with the newly planned trails in the State Park?

Environmental Education
A limited environmental education program occurs on the refuge. Although the refuge has a small established environmental education site, it has not been used in recent years. There is high public demand to increase environmental education opportunities on this refuge, but we have been unable to, given our current level of funding and staffing. Instead we have concentrated our environmental education efforts on Occoquan Bay Refuge.

■ Can we improve the quality of our environmental education program given our limited resources?

■ Could we effectively expand those educational opportunities through partnerships with other educators?

■ Would allowing public access to the environmental education site via the proposed Sycamore Road trail affect the quality of our educational programs?

Northern Virginia Regional Park Authority Lands
A large portion of the refuge, including the Little Marsh area, is land leased from the NVRPA.
Issues, Concerns, and Opportunities

■ Should the Service pursue full fee-title ownership of the land?
■ Are there opportunities for a land exchange?

Volunteers and Friends
There were a number of individuals, groups, and the Friends of Potomac River Refuges interested in projects to support all three refuges.
■ How do we best coordinate efforts among individuals and organizations?
■ How do we prioritize our staff and funding resources to develop and support meaningful projects that meet expectations and are consistent with refuge purpose, goals, and objectives?

Featherstone Refuge Issues, Concerns, and Opportunities
Based on core team discussions, agency scoping and public scoping, we developed the following set of issues, concerns, and opportunities which we address under our various management objectives in chapter 4.

 Refuge Administration and Management
Management emphasis on this refuge has been limited due to higher priorities for refuge staff and available funding and other resources on Occoquan Bay and Mason Neck Refuges.
■ Is the level of management attention on this refuge commensurate with its resource and public use values?
■ Are there alternative ways (e.g. partnerships) to increase the effectiveness of management on this refuge?

 Maintaining or Restoring Biological Resources
■ How can we ensure Featherstone Refuge continues its supporting role in a significant eagle conservation area in the Chesapeake Bay watershed? Eagles have nested on the refuge in the past. What steps can we take to attract eagles to nest here again?
■ Featherstone Refuge has low migratory and resident waterfowl counts in comparison to other areas along the Potomac River.
  * How can we most effectively determine why these numbers are low?
  * Do we need to collect baseline data?
  * How can we most effectively partner with State, local, and conservation groups on this type of project?
■ How can we best manage the refuge as a neo-tropical migratory bird breeding and migrating location?
■ We know very little about the resources on this refuge. Is there other Federal trust or State species of conservation concern we should be managing for on the refuge?

 Protecting Wetlands and Water Quality
Featherstone Refuge was established, in part, to protect its wetlands. The refuge’s wetlands are at risk from spills from the adjacent commercial industrial park and from shore water runoff from upland drainages. There is a need to establish soil and water baseline conditions onsite and offsite, and monitor effects from pollutants, to address the following concerns:
• Is the refuge receiving contaminants from the industrial park adjacent to the refuge?

• Are there impacts from former landfill activities?

• Are there impacts from storm water runoff, for example, Farm Creek discoloration, fish kills, other hazards to wildlife from runoff and other pollutants?

• How can we most effectively establish baseline conditions?

• Is storm water runoff and siltation onto the refuge a serious problem?

• Can we establish partnerships with other organizations to conduct monitoring (e.g. Ecological Services Division)?

• Based on baseline results, can we establish partners to help in correcting and mitigating negative results?

• How can we best work with Prince William County to address runoff and drainage issues?

**Climate Change and Shoreline Protection**

Similar to our discussion for Mason Neck Refuge, Featherstone Refuge is at risk from predicted impacts related to climate change and shoreline erosion. Featherstone Refuge, due to its comparatively lower elevation, is more likely to be affected by rising water levels in the tidal Potomac River. The issues questions identified for climate change on Featherstone Refuge are similar to those for Mason Neck Refuge.

Shoreline erosion is an existing problem that will be exacerbated with predicted climate change impacts. However, unlike the bluffs and steep banks on Mason Neck Refuge, the shoreline of Featherstone Refuge has a more gradual slope and is backed by wetlands rather than upland forest. Rising waters would inundate lower areas and create a mix of new wetland habitats while losing some current shoreline areas. While maintaining a stable shoreline is important to sustaining the integrity of the refuge, protecting the existing shoreline would be a daunting challenge. The issues identified for climate change include:

• Is protection of the current shoreline necessary to protect refuge resources?

• At what level of climate change impact/sea level rise would protection of the shoreline become critical?

• What, if any, areas of the shoreline should be protected?

**Public Access**

Public access is the overarching issue at Featherstone Refuge. Currently, there is no public access for several reasons. In order to access the refuge, visitors would have to park on private lands and walk across privately owned land, including an active railroad right-of-way, a gas pipeline right-of-way, and/or a subdivision. Public safety is a major concern with access. We need to address that problem before allowing any public uses in the future.

• Should we look into weekend use of parking facilities near the Virginia Railway Express (VRE) station as part of a plan to allow access?

• Can we establish partnerships with adjacent landowners for the public to gain access to the refuge?
Issues, Concerns, and Opportunities

- The southwest corner of the refuge presents different opportunities for access; can we find a way to work with neighbors in nearby townhouses for the public to gain refuge access?

- Should we consider the possibility of access by water trails for canoeists, kayakers, and power boaters?

Trails and Trail System Integration

Featherstone Refuge is considered a great location in the local area for bird watching and other wildlife viewing, and many residents encourage resolution for finding safe, public access. Continued public involvement in resolving the access issue, and helping to determine trail needs, could bring increased awareness about these and other issues which impact the refuge.

- Would it be a good area to build a birding trail—using natural materials, observation blinds, and boardwalks over wet areas?

- Can we make use of the old railroad grade that runs through the refuge as a location for a walking trail?

- Could Featherstone Refuge be managed to include a segment of the Potomac Heritage National Scenic Trail (PHNST)? Could we make the portions of the trail through the refuge accessible for pedestrians only or for pedestrians and bicyclists? Can we partner with the Prince William County to establish a trailhead and to identify a suitable location for trail facilities on the refuge that contributes to a continuous trail network?
• Can the refuge be integrated with the Virginia Birding and Wildlife Trail?

• Should we consider the possibility of a trail at the southern end of the refuge (under railroad trestle)?

**Trespass, Vandalism, Law Enforcement**

Trespass and vandalism have been recurring problems on the refuge, although incidents have dramatically decreased with the presence of law enforcement personnel on the Refuge Complex. Trespass by anglers looking for fishing access to the Potomac River and shelters being built by homeless and displaced people are examples of trespass problems in the recent past. Dumping of household and commercial debris and waste are examples of vandalism that has been a problem.

• Can allowing public access and building trails help with this situation? Will a greater public presence on the refuge reduce incidences of trespass and vandalism?

• Are we distributing our law enforcement effort among the three refuges in the Refuge Complex most effectively to deal with the level of violations and resource impacts?