On a Wing and a Prayer: A Wetland Mitigation Dilemma*

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Background

Nearly 10 years ago, oil and other hazardous pollutants were released into a wetland by the Northstar Refinery Company of Duluth, Minnesota. Under federal law, the company is responsible for the damage it caused—not only for the pollutant cleanup, but also for the presumed loss of wildlife and habitat. The company needs to mitigate this loss, i.e., replace or repair what it damaged. After five years of negotiation, the U.S. Fish and Wildlife Service (USFWS) claimed $80,000 for damages to the wildlife of the "Northstar Wetland." Bruce Washburn, an Environmental Contaminants Biologist with the USFWS, is responsible for ensuring that the mitigation is complete within the next two years.

Bruce reconvened the interagency work team and got up to speed on the history and status of the Northstar Wetland. If on-site restoration at the Northstar Wetland wasn't feasible, the USFWS could do restoration work off-site to compensate for the damage. Bruce learned that a local environmental group, the Arrowhead Citizens Action Committee (ACAC), had directed the preliminary investigation of 28 potential mitigation sites. Lea Vang, now a wetland regulator with the State of Minnesota's Department of Natural Resources (DNR) and part of the interagency team, participated in the ACAC evaluations. They had identified five of the 28 sites as candidates based on similarity and proximity to the Northstar Wetland, the need for restoration, and community support. They had conducted rapid field assessments on the five sites plus the Northstar site with assistance from Bruce's predecessor and from Steve Anderson, an interagency team member and wetland specialist with the U.S. Army Corps of Engineers.

The group opted to use three complementary assessment techniques (see Appendix) to select two sites for detailed restoration planning based on the potential to improve wetland quality. After identifying Pike Point and Northstar, however, Bruce's predecessor became overwhelmed with another pollution crisis and never arranged for restoration plans of these two sites. Bruce hired Mark Gilhooly, Senior Consultant with North Shore Environmental Design, to complete the restoration plans within four months based on available site information. Bruce knew they could not miss the short Minnesota summer to make significant progress on the actual restoration. After Mark delivered the plans to the interagency team (Bruce, Lea and Steve) in early March, they had to reach a consensus within the next few weeks on which site to restore. The four agreed to meet at the Northstar Wetland the following week.

March Meeting of the Interagency Team

Bruce and Mark arrived early at the Northstar Wetland so they could get oriented to the site and the plan. The deep, melting snow made traversing the site difficult, except on the compacted snowmobile trail through the site. Before they could make much progress, they were joined by Lea and Steve. From the highway separating the site from a small refinery they could see the entire 12-acre wetland. Even with the

*__Note:__ The essential elements of the case are based on a real mitigation problem; the specifics of the sites and all costs are the same as the actual mitigation but the names of places and people have been changed.

snow cover, they could make out the old dirt road and an odd berm (perhaps a failed attempt at a road?). Little of the surrounding landscape was much above the water table; expanses of meadow and bog were, for now, holding off the westward expansion of Duluth (Figure 1). Their second site, Pike Point, was an industrial site on the Lake Superior side of Duluth, 800 feet below them, along the St. Louis River. These two sites couldn't be more different.

Figure 1

Bruce reminded the group, "According to the legal settlement, our main goal is to restore lost wetland attributes, placing a premium on actions that benefit migratory birds."

Lea responded first, "With an invasive grass (reed canary grass) covering nearly half the site, reducing habitat diversity, this site currently has low wildlife value, according to the Minnesota Rapid Assessment Method" (see descriptions in Appendix).

Bruce agreed, "The Habitat Suitability Index (HSI) models suggest there is room to improve habitat for five species at Northstar—coots, red-winged blackbirds, yellow-headed blackbirds, snapping turtles, and wood ducks. The wood ducks are limited here by the lack of trees, but the remaining species really need deeper, open water. The habitat is great here for marsh wrens, though. A logical restoration strategy for wildlife sure isn't obvious to me unless we want to turn this into a pond."

"As you can tell from my restoration plan," Mark interjected, "I didn't recommend trying to radically change the hydrology on this site. There isn't much upland directing water to the site—the watershed is only about 160 acres. Also, constructing a dike would be expensive; the outlet is broad, 600 to 700 feet. Historically, this site was probably a wet meadow, but with better flow-through of water. I did recommend that we remove the berm and put culverts in the old road to improve natural flow patterns (Figures 2 and 3). That should cost about $21,000."

Figure 2

Figure 3

Steve concurred, "My assessment of Proper Functioning Conditions (PFC) suggests that the biggest problem on the Northstar site is the road and berm and their impacts to the site's hydrology. Your plan sounds good to me, Mark, but this snowmobile trail is an impact, too."

Lea seemed pleased at first. "If we get the water flowing again, I wonder if that wouldn't make this place less suitable for reed canary grass. Perhaps it would favor more diverse native vegetation and improve wildlife habitat quality. On the other hand, who knows? No one really knows how to manage this plant very

well—or even if it's really damaging to wildlife. I can check on the snowmobile trails, since they are managed by DNR. I know what they'll tell me, though: if we move it, there's no place else to go but through another wetland."

Mark continued: "I don't think repairing the hydrology is going to be enough to get rid of the reed canary grass. My plan calls for an initial spraying with a broad-spectrum herbicide—Rodeo, a glyphosate, followed by four annual follow-up treatments targeting problem spots. My cost estimate for these chemical treatments is $12,000. I didn't recommend planting in the plan; I believe that the vegetation of the uninvaded parts of the wetland is pretty good and will spread into the treated areas."

Bruce frowned, "For $33,000 we get the water moving through the site, treat the canary grass, hope it goes away and something better comes in. And hope this adds up to better migratory bird habitat."

Mark was annoyed, "You could spend the balance of the settlement money on plantings, but I just don't think it's necessary. The native sedges and grasses will spread clonally and even by seed on-site. This Northstar site is a pretty good wetland right now; I strongly believe wetland quality could improve here with a modest investment. If you want to move some earth, plant some plants, and see big changes, then go with Pike Point. It's three acres of mostly asphalt road with no discernable wetland attributes (Figure 4). You can't help but improve that site. An asphalt road certainly isn't wildlife habitat."

Figure 4

Figure 5

"Pike Point is in a pretty interesting spot, too," Steve added. "The fill and coal piles from industrial development obscure the natural point that jutted out into the St. Louis River (Figure 5). It might have been part of the river; I'm not sure what kind of wetland it could have been. I do like that the site is adjacent to a long channel that connects to the river. I think that increases the chances that wildlife will use our mitigation. So, even though the site is small—just about 3 acres—the resulting value to wildlife could be great."

Bruce paused, considering his options. "I generally like your plan for the Pike Point site, Mark. Creating a wetland that is a mix of open water and emergent vegetation with lots of edge will support most of the target wildlife species. Creating a wooded swamp and wet meadow would be worthwhile, but it's too expensive."

Mark seemed encouraged but weary. "But some of the planting costs are for the windbreak. We need to reduce the coal dust blowing on the site. Also, if we remove a road and rework the entire site, we'll have a lot of bare ground. If we don't plant something, we may not get high-quality habitat—we may get 3 acres of weeds."

Lea offered her opinion. "I was pleasantly surprised that ripping out the asphalt road, removing the debris and some fill, and regrading to create the wetland could be done for $61,000. $160,000 for revegetation is a lot—double the settlement. It may be worth it to see what seeds blow in."

Clearly the rest of the team hoped that Mark would reveal an affordable option for Pike Point. Instead Mark warned, "With an industrial site like Pike Point, you are going to need to spend some money to get something that's as good as Northstar is right now."

The team seemed to be at an impasse. Bruce suggested they warm up over a cup of coffee and make a decision.

Questions

1. What is wetland mitigation? How is it different from wetland restoration?
2. What is the main mitigation goal of the USFWS for this project? Is this goal a direct response to the pollutant release at the refinery?
3. Should the refinery be responsible for mitigating the damage to the Northstar Wetland, since the effects appear to be temporary? Why or why not?
4. Why do you think the team is enthusiastic about removing a road at Pike Point but did not even consider it at Northstar? Why do you think the team is willing to turn Pike Point into a deeper water wetland but not Northstar?
5. How does the landscape around each site affect its restoration potential?
6. What are the risks associated with each choice?

Dilemma

- Which site should be selected for the mitigation? Justify your decision.

Appendix—Some Background on Wetland Assessments

MNRAM

Minnesota Routine Assessment Method (MNRAM) is widely used in Minnesota to evaluate wetland functions and services (many states have developed a comparable tool). MNRAM is used to assess existing wetland conditions for making decisions between protection and development. MNRAM users answer "Yes" or "No" questions or rate responses "High," "Medium," or "Low." The categories (functions and services) are: vegetation diversity and integrity, maintenance of hydrologic regime, groundwater interactions, flood and stormwater attenuation, water quality protection, wildlife habitat, aesthetics, recreation/education/cultural use, commercial use, shoreline protection, and fish habitat. The answers are summarized for each category using dominant ratings or by comparing responses to descriptive standards provided.

PFC

Assessment of Proper Functioning Conditions and Supporting Science for Scenic Areas. Straightforward ratings are used to evaluate the condition (current status) of wetland functions. PFC users supply "Yes" or "No" answers to 20 questions describing the hydrology, vegetation, and sediment attributes of a wetland. Based on these responses, a wetland is evaluated as "functioning," "at risk," or "nonfunctional." PFC users can then investigate possible causes for "No" answers to see if management actions can remedy problems.

HSI

Habitat Suitability Index models are used for assessing habitat impacts and providing management guidance for improvement or protection efforts. Each HSI model summarizes known facts about the habitat requirements and preferences of an individual species. Relevant habitat components are converted to suitability indices scaled from 0–1 with a score of 1 representing the most suitable habitat condition. Models do not exist for all species of interest.