Land Use Committee Members
Bainbridge Island City Council

Re: Wetlands and their Buffers

This subject is as interesting to me as it is puzzling to you. What should you do with the questions raised by Larry Frazier and Steve Morse? I have some suggestions and semi-answers, based on 18 years of looking after studies at a clutch of labs studying riparian habitats and freshwater biology. Currently I'm on a technical committee for the County, confronting these same critical-area issues. Since the shoreline uprising two years ago, I've gone through some 3500 journal articles and abstracts dealing with buffer-related topics. For the Planning Commission I concluded that the supposed benefits of tidewater buffers are largely vacuous.

But wetlands are different.

Different from streams. Different enough from other waters that I agree with Larry's and Steve's suggestion that, for protection planning, wetlands might well be addressed separately from streams. Not because GMA lumps them differently but because different geography and dynamics attend them. That suggestion might be altered later, though, if it turns out that implications for landowners and oversight turn out to be about the same.

And different from each other. If there is a typical wetland on the Island it is perhaps a few acres in size, perched on shallow hardpan, dry in the summer, and dominated by alders and willows, salmonberry, sogginess, and mosquitoes. But their diversity is an important matter, for Nature and for management.

The staff has a wetland inventory, which I haven't seen. I suggest as a first step, study their map and any categories they've listed. Second, visit several. What range is there in things that matter to you--features of the wetlands and the nature of their neighborhoods? Do the three OCD neighborhood categories embrace our situation and help you help landowners? Given the variety and value of nearby landscapes, do you need more classes? Also, what about classifications of wetlands themselves, based on what is there, and in what ways that matters. Never mind the people who feel compelled to

1 In the December 31 Frazier-Morse memo to you, at page 3.
classify: Do you perceive differences that warrant varied management? You very well may. For example, just the difference between seasonal and permanent waters, their sources (storm vs groundwater), their vegetation complexes, their depths and their ratios of perimeter to volume, or other indicators of diversity may draw you to conclude, "That depends".

What are your expectations for and from wetlands? Our wetlands have ebbed and flowed with climate changes, and all are relatively recent geologically. Wetlands support few kinds of plants. However they generate lots of biomass, and most are shrinking simply by filling with decaying vegetative detritus. What can you learn about the natural future of Island wetlands, given their current surround? Is it bad? What are the things Island wetlands are actually doing ("ecosystem functions" if you please)? Are they doing those well? If not, how much effort and money should we put into somehow supplementing those functions? If the mix of wetlands seems askew here, can it be altered? Should it be?

Now, about buffers. Please, buffers are a means to an end. If you want buffers for some reason other than helping wetlands, put them where they can do that other thing best. As the new DOE wetlands pub points out, and planners seem to have forgotten, buffers are not a universal Band-Aid. If ill-conceived or ill-designed they probably won’t work, meanwhile tying up large and valuable spaces that might be well used otherwise. For instance, a circular 1-acre wetland with a 100-foot buffer actually occupies 3.4 acres.

What do I mean, they might not work? This leads into three questions: Work for what? If they do work, how wide should they be and what should they be like? If they don’t work, what then?

What do we expect from buffers? Protection from the outside world. And in some cases, benefits that only the buffer can provide.

There is much talk about the goodness of buffers, drawn mostly from places that aren’t like the Puget Sound country. Rather, the studies are done typically in farm country, or steep forest land, usually with deep soils and rarely with our hardpan, and typically in summer-rainfall regions. Here are some often-cited benefits from wetland buffers, and my assessment of their relevance on the Island:

Capturing sediment, driven by erosion--Concern about sediment goes back decades to rampant logging and land clearing. However the erosion
concern may be beating a dead horse. I suspect there were three periods in Bainbridge history when erosion was prevalent. One was the 1870s and 80s, when logging and burning reached almost everywhere. Another was the era of stump ranching when everybody had livestock and overgrazed pastures were the norm. The third was the time of strawberry farms when much of the island was kept clear for berry culture, with long rows of bare soil exposed to winter rains.

A few pastures are still with us, but given sensible animal management the Island's risk of rill erosion, the main source of sediment outside construction sites, is probably nil. Certainly woods and subdivision lawns don't carry that risk.

Stormwater runoff--Many if not most Island wetlands depend at least partly on stormwater for their existence. However, interdicting stormwater is commonly claimed for buffers, so I'll mention it. A usual argument is that trees transpire stormwater, but that only works during the growing season, when it's least needed because our rainfall is low then. During that time, lawns actually transpire more water than woodland, because the "primary productivity" of lawns is higher.

Absorbing nutrients and chemicals--This is a big thing and complicated because of the variety of chemicals. All arrive at the buffer and then the wetland with stormwater. Nitrates and phosphates are the major nutrients, coming from maxed-out drainfields, animal doo, and decaying vegetation. Up to a point, nutrients are important to the biotic complex in wetlands. Wetlands are sinks for both of these nutrients, which support the high productivity of plants and invertebrates there. In some wetlands that's too much of a good thing, but it's not constrained by buffers, because of the limited role of buffers in stopping stormwater.

The same weakness of buffers applies to petroleum products and heavy metals. It is argued that vegetation, by capturing rainwater, also absorbs the chemicals. It does, but only in the growing season and only up to a point: plants have a limited capacity for the chemicals they don't need.

An asset of wetlands here is their abundance of clay-sized bottom sediments. By adsorption these gather phosphates, toxics and metals. Our wetlands' typical low (acid) pH helps too.

DOE says that wetlands have four functions related to improving water quality. They are removing sediment, nutrients, metals, and toxic organic compounds. They confirm the research conclusion that buffers are pretty limited in their Band-Aid abilities.

I can supply you with references showing how ineffective forests

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3 The DOE pub again.

4 The DOE pub, page 2-26.
typically are in restraining runoff products in a buffer context. They simply become overwhelmed, especially where soils are dense and slow to absorb water, as on much of the Island. The hardpan helps keep chemicals out of aquifers but speeds the chemistry downhill to the wetland. So pervious are woods that a research compilation noted to you by the Planning Commission points out that 300-foot wooded buffers are no more effective than 6-foot buffers.

The primary enduring solution to chemical pollution of wetlands that I can recommend is cutting off chemicals at the source. I notice that Island Watch recommends the same thing in its December edition. This may not be an indictment of septic systems. Snohomish County, in an assessment of their many lowland lakes, found that the quality of lake water is better where shores are lined with homes than where they are not.

Wildlife habitat and wetland buffers--You will hear that wetland buffers comprise 'critical' habitat. That buffers and important habitat coincide may be real or a stretch. You face five issues here--

- Do we need more habitat on the Island? If so, for what species?
- Does the quantity or welfare of wetland creatures (mostly invertebrates) vary with the amount of adjacent non-wetland vegetation? What would this vegetation be like in the absence of a designated buffer? Would that alter the quality of life for wetland species? Indeed, how many species are dependent on wetlands?

Deermouse droppings and wood duck doo
Critter evidence it's true
But I don't know and nor do you
If they here reside or just pass through.

I don't have answers for you, nor do I think you've yet been given any. But do ask the questions.

There may be a legalistic matter here--can you require a buffer under the banner of critical areas, for species that have no 'critical' relationship to wetlands? Are buffers a form of open space and susceptible to the Camas principle?

So, what good news do I have for you? First, buffer science doesn't lead us toward a best buffer design for Bainbridge. That gives us flexibility and room to design for our conditions. DOE points out that recommended buffer widths vary from nil to 3000 feet. These numbers are based partly on particular conditions and measurements but mostly on conjecture and, frankly, viscera. Needing 3000 feet implies that buffers barely function--their efficacy per furlong of width is obviously very low, in some analysts' estimation. Buffering is a highly land-intensive way of nurturing wetlands, in the very places

8 These include the DOE pub’s section on buffers.
where land is at a premium.

Second, we have no quantitative with-and-without, replicated research covering the special circumstances of the Island and Kitsap County generally. In a way that’s good news, because research about wetlands and their buffers can be readily undertaken. You can do something about that, and it doesn’t involve trips to Mars.

Third, ‘native’ vegetation requirements for wetland buffers have only limited validity. No research shows that functionally equivalent non-native vegetation is somehow inadequate. So another bit of good news is that there is no reason why owners can’t use some creativity and diversity in managing near-wetland vegetation. No matter what, the buffer will not have the same array of vegetation as the wetland; otherwise it would be included within the wetland, since wetlands are defined by their vegetation.

Fourth, there’s the rather good chance that residential yards and already-required open space will do all or most of what we would like from buffers. Put another way, there is no evidence that Bainbridge yards and lawns have contributed to the deterioration of wetlands.

A partial conclusion. DOE characterizes wetlands as sumps and surge tanks. Some of ours are collection points for beer cans and condoms. But those aren’t my visions for the future, and I’m sure not yours.

Stewardship of wetlands may require that buffers be replaced by other means of doing what we really want for wetlands, whether it has to do with sediments, stormwater, habitat, or whatever. Otherwise buffers and wetlands may become a bad and costly joke in the annals of ecosystem management.

Recharge (also called infiltration or retention) ponds, with their chain-link fences, are ever more common. If large enough, they probably are the functional equivalent of wetlands—ducks, cattails, and all. Too, I know of roadside ditches designated as wetlands, perhaps after seeing salmon spawn in them. King County planners point out that paved surfaces may be better than forests for capturing runoff, if there is a recharge pond.

Anyhow, do go visit some wetlands. Steve can interpret what you’re seeing.

Don Flora

CC: Larry Frazier
    Steve Morse