

PERSPECTIVE

Ethical Considerations in Habitat Improvement

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Recently a government employee issued a response to a dock permit application that I found to be fairly stimulating. I thought I would share it and the thoughts it invoked regarding the ethical considerations associated with habitat improvements.

The situation was that the applicant had augmented the dock application with a proposal to place limestone boulders in the vicinity in order to enhance the local habitat and somewhat offset the negative effects of constructing a dock. The government employee replied with a suggestion that the boulders not be used and that a manufactured fish attractant be used instead. I am avoiding using any brand names here for obvious reasons. I was stunned that the government agent *did* use a specific brand name when several are on the market, but that can be the topic for a different day.

The fish structure suggested is made of concrete and was designed to attract fish to artificial reefs. The benefits of such a structure are several. They do attract fish and provide a hard substrate for the attachment of normally epilithic organisms. A community forms and in most cases the observer is impressed with the abundance and diversity of life. It is deemed *good* by the agency staff. Permits are issued and the habitat is improved. Or is it?

What does it mean to *improve* habitat? The currently popular definition is not written down but does seem to revolve around increases in hard substrates over soft substrates; vegetated bottoms over unvegetated bottoms; higher over lower dissolved oxygen concentrations; and increases in diversity.

As I pondered this, I found my files and notes to be replete with examples. I am aware of numerous habitat improvement projects where *Spartina* or *Juncus* has been planted in mud flats. Artificial reefs made of fish attractants, sunken ships, and waste concrete have been placed in sandy flats to increase diversity and recreational advantages. There are examples where *undesirable* monoculture forming native plants such as willows and cherry laurels have been replaced by *desirable* native non-monoculture

forming plants to increase both plant and habitat diversity. There are salt barrens which have been planted with mangroves and succulents to improve upon the blank salty sands of the flats. There are places where organic mucks were dredged resulting in clean sand flats. Oxygen bubblers have been installed to increase the levels of dissolved oxygen. All these projects are commonly perceived as habitat improvements and are therefore *good*.

Consider though the logic train that if any change to the naturally occurring local habitat is considered an impact¹ and any departure from the naturally occurring habitats is considered to be a negative impact,² then *improving* a naturally occurring sand flat by dropping an artificial reef on it must be considered a departure from the natural. Planting *Spartina* on a naturally occurring mud flat must also be considered as a departure. Each of these, however, may also be considered to be a restructuring of the balance between one type of locally occurring habitat and another.³ Artificial reefs structured differently⁴ than locally occurring reefs constitute a departure from the natural which is outside the realm of rebalancing: a five acre rectangular reef 15 feet in vertical relief cannot be equated to a 4 foot high relict shoreline ledge reef. But it is great for fishing.

Now consider some imaginary projects to illustrate the point. Think of how you might expect the permitting agency to react to these projects. Consider an application to place boulders in a grass bed, such as for a jetty or groin. What about the placement of sand over a portion of a field of ahermatypic hard bottom such as rocks and shoals, or even over grass beds. Consider the establishment of a channel through a grass bed or a reef.

In projects that are considered *good* with regard to habitat improvement, the diversity is increased or a parameter such as depth or dissolved oxygen is modified to provide a habitat more abundantly populated by more species. Note that in each of the hypothetical *bad* projects mentioned in the previous paragraph, the physical diversity of the habitat has also been increased. It is well accepted that a greater physical diversity will accommodate a greater biological diversity. Why, then is it *bad* to take half a grass bed and replace it with hard bottom?

I suggest that you consider the possibility that habitat *improvement* has become somewhat subjective and quite arbitrary. It is forbidden⁵ to eliminate sea grass beds, while the planting of emergent grasses on mud flats is encouraged.⁶ From the point of view of the creatures that inhabit mud flats and not *Spartina* flats, can this be considered an improvement? There are numerous polychaetes which have evolved over

ecological time to effectively deal with very low dissolved oxygen conditions. The inferences are that not all low dissolved oxygen situations are anthropogenic and that to eliminate them all by *improvement* would in fact endanger those creatures so adapted. In Tampa Bay, there is a flatfish so evolved to deal with this situation that it curls like a leaf, cryptically floating to the surface where oxygen levels are more abundant. Evolving the behavior and biology to act in these ways predates the advent of human degradation.

In the first situation involving the fish attractants, the boulders had been offered because limestone boulder outcrops do occur locally and many had been covered by development, reducing the abundance of this habitat. Rock or coral reefs with strong vertical relief simply do not occur in the vicinity. So while the fish attractants may increase diversity, are they an improvement?

This is where the ethical challenges begin to crop up. The ethical challenge in all this is what you as an environmental professional do when placed in the situation. There is a direct responsibility to your client to obtain the permit. There is an implicit responsibility in your profession to avoid unnecessary damage⁷ to the environment. There is an easy excuse in blaming it all on the government agent who requested the changes. But what if you are that government agent?

Unfortunately, I am not certain there is a solution to this ethical challenge. The negative impact of habitat improvements which are not in keeping with the local ecological structure is not likely to be seen as such by the majority of those involved. The negative impact to your client's budget and project, should you argue the point during permitting, is quite evident.

Notes

1. Impact being change.
2. Negative being the vector of the change and indicating a departure from normal.
3. The reef and grass must be locally occurring to make this argument.
4. The structure includes boulder size, boulder material, placement, vertical relief, linear or block formation, general size characteristics and other parameters.
5. In permitting parlance.
6. Many planting projects are publicly funded or accepted as mitigation.
7. Damage being a negative impact.

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