MR. O'CONNELL: Our last speaker before the break is Don Schall. Don serves as a Senior Biologist at ENSR's Sagamore Beach, Massachusetts facility. Don has thirty years of professional experience in conservation education, wetland mitigation planning, vernal pool investigation, and plant and wildlife habitat assessment.

Don has served as a project manager for numerous coastal and inland wetland resource area evaluations, marine and freshwater plant and animal inventory, and wetlands impact assessment. Prior to joining ENSR, Don was the education curator for the Cape Cod Museum of Natural History in Brewster, and presently serves as a member of the Brewster Conservation Commission and the State Task Force on rare plant conservation.

Don has a BA in biology from Seton Hall University and a Master of Forest Science from Yale University School of Forestry and Environmental Studies. Don's going to tell us how we can enhance wildlife habitat using vegetation on dunes and coastal banks.

MR. SCHALL: Thank you.

I think time should be spent, and maybe it'll come up in the discussion, talking to the permitting of the activities that are proposed. I mean, it's not difficult to come up with an engineering solution, and perhaps it's a little more difficult to come up with a soft solution that addresses the issues for coastal erosion. The permitting process is part of the time frame that should be considered for some of these processes and, although it was briefly touched on earlier, it can be quite long. I've been involved in projects where the actual final project may be approved two to three years after the submittal of the first application. Generally you can get over the hurdles with physical access, use of equipment, storage of equipment, management of equipment on site, but then you may deal with commissions that are, in my experience, reluctant to explore new ideas. We have offered sacrificial dunes in some projects, where I've had commissions say no to sacrificial dunes, that's not appropriate. We'd rather have the dune keep washing away. So although the literature and the science indicate that it's appropriate for the implementation of a sacrificial dune, in this case, one particular commission said no, the dune is adequate the way it is. Come back before the commission when you're starting to lose your coastal bank, and then we'll consider a sacrificial dune.

So a proactive response in that one instance was not accepted. I've also had the other extreme, where commissions have permitted major restoration work similar to that that you've seen on coastal banks in the studies presented today, without much review because they've been very supportive of the project, and you haven't the need to justify it. I've had commissions that have permitted actual re-grading not only at the top of the coastal bank but also on the face of the bank, as long as the volume and structure altered was replaced adjacent to it.
So overall, the total volume remained, but the height of the bank face was reduced so the amount that you're restoring was more manageable. Erosion in this particular case was not primarily from wave action; it was briefly touched on in one of the presentation. Erosion was from sheet flow coming over the face of the bank, causing soil slumping, collapse of the bank, and then the bank itself wearing down.

In my experience, although not everyone here may agree, I see one of the major deleterious effects on coastal environments adjacent to coastal banks is caused by allowing trees to stand precariously on the edge of the coastal bank. The advice that was given to that individual homeowner was that the tree should be removed. Because when they go, when they're on the face of the bank or at the top of the bank, they create a scar or weak spot on the bank that allows the whole bank to collapse. And then the small erosion gully serves as a focal point that concentrates the sheet flow, which accelerates erosion. And in those areas where you've seen a tree that has generally come down, you start to see where the top of the bank runs along the edge, lifts inward at the break, and then comes back out and follows a natural contour. It is usually at the base of that weakened area where it lifts in that one sees a well-defined delta of soil or a sediment fan that is carried out along the beach.

My experience working in Barnstable County is that the region is ideal if you're looking for examples of coastal erosion. Why is it? I found in my experience in trying to permit a project and to convince a conservation commission that it's appropriate to alter the environment, it's not difficult for a large state, federal, or even a nonprofit organization to go forward without major hurdles, so that a project is eventually permitted. In some instances, it's very difficult, in some cases for an individual homeowner or an individual client to go forward. The burden of proof for making your case appears to be significantly more substantial.

However, I have also found that if you can show that what you propose to create will protect a historic feature, or have wildlife value, or its in keeping with the cultural history or the historic architecture of the area, then you have a chance to make a case that what you're doing is not a drastic change in the general nature of the community. It actually may be viewed as a restoration effort in a community or a landscape unit that was a natural feature a hundred years ago, fifty years ago, or twenty years ago. Whatever the case may be, these coastal systems are viewed as areas that are constantly in flux, constantly changing, though it's not inappropriate to maintain a community like this that shows the coastal dunes with a major blowout behind the small residence in this slide from Truro.

The other source of background information, to get some feeling for what former coastal environments were like, is to go through old postcard collections. This is the railroad station in North Truro, Massachusetts. And what I have for distribution, which I will have available as a handout, is a list of references that I have found to be useful for this purpose. One in particular, which deals with the long-term changes in the landscaped environment, is a small booklet written Dr. Dunwiddie, Peter Dunwiddie. It's entitled "The Landscape of Martha's Vineyard." Peter
also has prepared a small booklet similar to this for the Island of Nantucket. If you work through some of the references maintained by town historical societies or town libraries, you’re able to find photographs or old pictures, perhaps even of the actual structure you’re working on. The photographic record provides you with an understanding of the natural environment at the time of the photograph. This post card was taken around 1911 based on the postmark date that was on the back of the postcard.

In dealing with coastal environments, I look at the overall environment not only from the perspective I see as a consultant, who essentially represents my applicant’s interest, but also from the perspective that I have gained serving as a member of the Brewster Conservation Commission. So in regards to environments like this, the strand line or wrack line seen in the slide is important from a wildlife habitat standpoint. Although it’s not usually referenced or reviewed, you want to ensure that prior to, or at the completion of the restoration project, that you are not permitting the proponent to maintain a sterile beach by sweeping or raking the beach. There are certain permitted instances in recreation areas where beach raking may be appropriate. But environments like this in natural areas, where you’re working along the shoreline, the wrack line is an important resource for shorebirds (Figure 40). I’ve also noticed, and I’m sure others in the audience have as you walk the shoreline, not only are shorebirds active, but you also find evidence of raccoons, skunk, fox, and white-tailed deer activity along the beach. Sometimes you find tracks along the shoreline and you’ll see them coming out of the sand dunes or down the face of the coastal bank, walk a section of the wrack line and then back up into the coastal dune habitat.

This is a sanderling. This is a semi-palmed plover. I thought it was interesting in the discussions that Joe has been dealing with a federally listed species and the requirement for “no short or long-term impacts” in dealing with state-listed rare species. This is a very difficult hurdle for an individual landowner to get over, the no short or long-term impact requirement. Yet, in a situation like this, it must have taken months of negotiations to come to an agreement and a
resolution of the short or long-term impact requirements for a state-listed species, because a
taking includes the temporary collection of a species and moving it to another area. Under the
Massachusetts Endangered Species Act, that’s an impact. You’re collecting it, you’re holding it
temporarily and then you want to put it back in the area after work is completed. Well, that is an
impact. It’s a short-term impact and the short-term impact is a very difficult hurdle to get over.

The other areas that I’ve looked at and touched on in other presentations, is in coastal
dunes systems which are overly planted or so heavily planted that you’re losing potential shore-
bird nesting habitat. You risk losing nesting habitat for common terns, least terns, and other
coastal species that prefer more open coastal environments. For several years I would assist in the
removal of old beach grass material from the dunes at Gray’s Beach in Yarmouth. We would go
out and actually rake some of the debris and rock materials that collected on the backside of the
dunes, so there would be open sandy areas for nesting terns. It’s probably the unusual individual
property owner that is dealing with a shorebird colony in their front yard. Now, I’m sure that in
the town of Duxbury you can look at the habitat restoration on the spit as a primary nesting
habitat for shorebirds.

This is a common tern and a least tern. A coastal plant that is not widely recommended
for use for dune restoration, it’s rare that you find it in the literature as a planting suitable for
dune stabilization or bank stabilization, is poison ivy. The rampant growth cascading over the
sand dune in this slide is poison ivy. From a wildlife habitat standpoint, it’s an ideal species. The
literature references a number of bird species that depend upon the fruits of this plant as a food
source. The number of bird species is quite high. I’ve seen tables listing forty to sixty different
bird species that feed on the poison ivy berries. However, poison ivy is not a plant that I would
recommend to a commis-
sion. Can you imagine
the reaction that you
would get if you said, “I
want to restore the bank
and dune with poison
ivy”.

The other vine
that I find beneficial —
the other vine that does
show up in the literature
as suitable for coastal
environments and does
possess wildlife benefits,
is known as Virginia
Creeper, or Woodbine

Fig 41. Artemisia stellerian in flower, Brewster
(Parthenocissus quinquefolia). You find that this vine is recommended as a suitable species for coastal environments for stabilization. What first comes to mind is that I've seen this vine covering someone's chimney. You know it's selected for homeowner use because it's widely available and it has a handsome leaf pattern and leaf color in the fall.

Here are a few slides of other species that are available for coastal planting to increase species diversity. This is Dusty Miller (Figure 41). The question was raised earlier in the program as to whether or not you should use Salt Spray Rose. Well, the same concern applies to the use of Dusty Miller. If you're a purist and you want only native plants than this plant would not make the cut. Dusty Miller was introduced to the United States in the 1880s. The literature indicates that Rugosa Rose or Salt Spray Rose was introduced in the 1860s or 1870s. Well, at some point the plant became naturalized, and it's now presented in the literature as a naturalized plant. Granted, Rugosa rose is not a true native species, but I find that it doesn’t tend to be, in my experience, an overly invasive or aggressive species (Figure 42).

I also agree with the statement made that it should be pruned regularly. On many occasions, when you're before a conservation commission at a public hearing and your applicant finally receives the approval permits, he thinks his project is finished. It was nice to hear concerns about the requirement for maintenance of the planted species. If you're looking to maintain wildlife habitat, well, obviously, a plant like this isn't really included here as a major food source, nor would be the Arenaria, which is known as Sea Beach Sandwort, which is a perennial plant acclimated to the beach strand. These are perennial plants that grow successfully in exposed marine environments. These species are not all commercially available, but Dusty Miller is, but you usually end up finding a cultivated variety, more suitable for horticultural purposes.

I like the inclusion of native plantings in coastal environments. This is a slide of Beach Heather; there's a little cluster of Broom Crowberry in the slide also. Both species of Hudsonia are referred to as the Beach Heather or Poverty Grass (Hudsonia ericoides and H. tomentosa).

In the research

Fig 42. Salt spray or Rugosa rose (Rosa rugosa), Brewster
work that I have been doing out at the Cape Cod National Seashore in South Wellfleet, MA, I have found that small coastal habitats, like this, form their own microhabitats. And within the small microhabitats, there’s available shade. You’ll also find evidence of wildlife use within these unique community structures that are no more than a few feet across, if you’re there early in the morning you can find small rodent trails that lead into these little plant clusters. Time is spent there and then the small mammals move off.

I like the use of the Rugosa Rose or salt spray rose in coastal restoration projects. It’s been my experience when I’ve been surveying coastal environments that when you’re flushing up American Goldfinch or other small songbirds common to coastal shrublands that the birds tend to move from one population cluster of shrubs into another and on to another as you wander across the site. In the landscape design for a proposed development from a wildlife standpoint, it’s nice to have the plant populations staggered so there’s a random clustering of plants. And I agree, you will find, for whatever the reason, the use of odd numbers in restoration plant seems to give you a better chance of getting your project approved than plans using even numbers of plants. So there is something there in the numbers. There is some unknown reason behind this perception. You say you’re going to plant nine specimens, for some reason that sounds a lot better than eight specimens. I think what the odd number permits is that it allows you to work with a more random arrangement in the design or planting pattern.

Now, I know from studies that I’ve conducted under power line easements and transmission line corridors, where they’ve maintained isolated corridors of shrubs, that the level of predation on nesting birds, at least along the power lines, is reduced because when a predator gets into one of the isolated shrub habitats, they might just go through that first population cluster they find and decimate the eggs or young birds. But the other isolated shrub clusters, which do not form a continuum of plants, remain undisturbed and allow resident birds to reproduce successfully. So from a wildlife standpoint, I’d rather see the clustering or the location of these shrub clusters placed with some distance between them so you’re not planting them as continuous band of vegetation. Many times you’ll see a whole band of shrubs that will run unbroken along a hundred-foot or a two hundred-foot distance. So it means a predator is able to start at one end where it has shelter and protective cover and it can just follow the shrub community down the line like you’re walking down a Band-aid, and just work through the shrub community feeding along the way.

You know, I’m interested in reptiles. It’s been in environments like this, a coastal sand dune that I’ve encountered the eastern hognose snake. It’s always been usually very droughty conditions, coarser sands, high summer temperatures, and generally a plentiful source of food, such as toads.

But an environment like this is also a suitable environment for hognose snakes, which is a state-listed rare species in Massachusetts. So you’re able to bring preservation of rare species habitat into your request for that permit — the more you can generate habitat for some wildlife
benefit, the more I think it establishes your case for the project that you're proposing to do.

It's a handsome plant, too. Naturalized, yes.

This is the type of habitat that I find again and again is really quite beneficial to wildlife. You may be able to see that most of these areas are covered in poison ivy. The other plant cover is a mix of bayberry and arrowwood. I'm not adverse, in appropriate situations, to the use of high-bush blueberry as a planting on coastal banks. I have found in situations where you see freshwater seeps American hazelnut and other woody shrubs surviving in coastal environments. Almost all of the oaks can occur on coastal banks, but once again, I encourage keeping them in low protected environments. You'll see scrub oak specimens commonly on the face of exposed coastal banks. Inkberry and common winterberry or black alder may also be found on exposed coastal banks. But the actual — not all of these are common on exposed coastal banks, but all of these species can grow in the coastal bank environment, and it does give you a chance for increasing the variety or diversity of species within the coastal community.

Obviously, salt spray is a major influence on coastal plants. Here is a slide of seaside goldenrod, which is a common species in coastal environments.

This is an example of a black cherry planted in a coastal environment. You can see all of the prior year's growth has died back, due to salt deposition. So in selecting your species, you want species that will withstand desiccating winds and that are tolerant of droughty conditions, tolerant of high winds, and full solar radiation. The growth that comes up this year will come up to about the same height and then the salt spray will just shear it off and hold the tree to a low-growing growth form. It's within clusters like this that one finds the eastern tent caterpillar. Maybe they're not a desirable creature, but black cherry certainly serves as a primary host plant for tent caterpillars, and tent caterpillars serve as a food source for birds. And I think the most important time of the year for these coastal shrub or maritime shrub communities, which are relatively uncommon habitats or environments, is the fall of the year. The maritime shrub communities along the coast are important resting stops during the fall bird migration and also in the spring. Migratory birds coming up in the spring following the coast will use this habitat as they move up the coast. In the fall, and late summer, as they're moving back to southern environments, the maritime shrub communities provide food sources in the seeds and fruits that have developed. Serving as feeding and resting station, birds are able to continue on their southern migration.

It was mentioned, I agree with what Dennis said, a fifty percent success rate for beach plum sounded pretty good to me. But when you're the homeowner and you buy ten plants and five of them die, well, you're not very happy. But from the standpoint of what you've actually accomplished, in time, the results will be apparent. Beach plum is a plant that grows to a height of three to four feet in an exposed coastal environment. In protected environments, you're going to see this species growing to a height of six to eight feet with almost a small tree-like form.

Beach plum is an important plant in the early part of the year as a source of pollen for
honeybees. I find that the temperature in late April and early May, and also if there's a series of heavy rains, has a strong bearing on whether or not you will see a good beach plum crop in the fall. Cold spring temperatures and heavy rains keep the bees from being out and around, they're not getting to the flowers and fertilizing them. Also, severe rains can strip the blossoms right off the stem, so you never get any fruit. But it's a plant species that once again serves as a small sanctuary or refuge within a coastal community. You can see from the way that the shrubs are staggered here that a bird could hop from one shrub cluster to another and make it up across the sand dune and up into the shrub cover on the coastal bank above the dune.

Just a nice slide of the random assortment of plants in what a more typical planting scheme might look like. This slide was taken in the Cape Cod National Seashore. You can see a nice species transition from the back of an old dune field, moving into a more arborescent or tree-like coverage in the background.

Up in the Province Lands in the Cape Cod National Seashore, this is a slide of willow. There was some discussion earlier that it is not unusual to see facultative wetland and even obligate wetland plants growing on the face of an exposed coastal bank, where a groundwater seepage or a seasonal discharge of freshwater is present on the bank. My experience has been, I agree with the other presenters, that these are very difficult situations to resolve where you have a freshwater seepage, or as you saw, a freshwater breakout over the face of the coastal bank. It's difficult to address bank erosion in these situations.

This will give you a feeling for what the natural communities might have looked like in the past before the coastal environment was commercially developed. This is a slide of groundsel-tree or sea-myrtle (*Baccharis halimifolia*). I see the shrub commonly in coastal environments in areas where the sand dunes transition into moist thickets or wet shrub environments.

And again, a slide of a mixture of community types in a coastal environment showing low shrubs and modest tree and shrubs. The taller shrubs in the slide are approximately twelve to fourteen feet high.

And once you've created the scrub and grassland habitat, bam, you're going to get northern harriers, or marsh hawks, hunting the open scrubland or grassland for small prey species, such as meadow voles and white-footed mice.

I have seen in the references for bank restoration works that you can buy artificial formed nest cavities made of plastic for belted kingfishers. I've also seen in the literature artificial nesting cavities for bank swallows.

Now, I'm thinking, is this what you have to do to put that nest in? You need to dig a hole in the face of the coastal bank. You know, the outside opening of a bank swallows nest is only about an inch to an inch and a half wide, and the average depth is usually twenty four to twenty-eight inches. So you're digging a hole as thick as your arm, as deep as your arm can reach, so you can put in and artificial nest. I have not had any experience with them and I have never re-
quested a permit to install one. I know that they're available and it would be one of those cute little mitigation actions that might get five members voting in favor of your project and two voting in opposition to your project.

I know that while wildlife habitat is an important interest under the Wetlands Protection Act, it shouldn't be used as the only interest to justify approval of a project.

It is as important as the other interests and concerns that you look at when you evaluate a project and look for conformance to the performance standards. As to any of you that serve as agents or commission members, you know that you're bound to review projects based on the ability to meet the performance standards. If you were looking for site mitigation, I'd like to know if anybody has been success in permitting an artificial bank swallow or kingfisher nest.

I wouldn't be reluctant to propose it to a commission, but it's — well, in my experience, it's sort of like offering tree swallow nests. Cute, but if no one is going to go out there every spring and remove the house sparrows and their eggs, then why put the nest boxes up. If the nest boxes are there, they're there for some higher purpose — whatever the decision of the commission — for some other more noteworthy bird and the applicant should maintain them as such. If you're not going to maintain them then don't offer them as mitigation and don't put them up. You're just doing more damage than good.

I think that was it.

But as I said earlier in the presentation, I wanted to bring a few of the more valuable references to your attention. These are a few of the guides and references that I've gone to and that I've found to be useful. Although the plants in this particular one are not generally common in our region, it's an introduction to planting and maintaining selected common coastal plants in Florida, a few of them do occur here in the Northeast. Nonetheless, I like what they did and it's suitable for a consultant to use as a guide, it runs through several features that should be noted if you're justifying use of a particular plant in a coastal restoration plan. One point is the make a clear statement on its ecological function and proposed use. The authors then talk about its resistance to erosion and they discuss the potential growth rate and its availability both from nursery sources and natural sources. And finally they then give you planting guidelines and they finish up with suggested maintenance guidelines.

Many of the grass species you will see repeatedly that there's a recommendation for mowing or cutting the grass to increase the vegetative vigor and force the plant to spread. So it's not just that one has the approval from a conservation commission to put the plants into the ground and you walk away from them and hope they survive. It's requires going back to replace specimens and, in some cases, re-cutting them to force more vigorous growth or to force the development of lateral branches resulting in crown spread. That's what I like about this particular guide – use the format to justify the plants that you're proposing to install in a coastal restoration project.

Cornell University has two booklets on plantings for wildlife that I recommend. One is entitled "Enhancement of Wildlife Habitat on Private Lands." This is principally for more upland
environments, but it does address issues that you could look at within the hundred-foot buffer zone to a coastal bank. Cornell University also published a booklet entitled "Vegetation Use in Coastal Ecosystems." This is a 1988 publication and it was interesting to review. One of the listed plants was autumn olive. It would be a very backward commission that agrees to allow you to plant autumn olive now. Every once in a while you find other plants that were once highly recommended that are now out of favor. Multiflora rose is one that comes to mind, and every once in a while you will still see it as a recommended species for improving wildlife habitat. Yes, it does serve that purpose. It's good for erosion control, extremely tolerant, extremely hardy, and a good food source for wildlife, but you shouldn't be introducing it into native plant communities and natural environments.

The University of Massachusetts published a very useful book entitled "Trees, Shrubs, and Vines for Attracting Birds." Once you've made your selection, if it's a species that's reviewed in the book, you can go down the list of species that use the plant and say these are species that prefer it as a food source. These are species that nest in it. These are species that use it for some other purpose. This information helps to develop the justification for your plant selections.

The State of Minnesota has "Landscaping for Wildlife" and a second nice little booklet, "Woodworking for Wildlife."

The guide shows you how you can build a nest for cormorants. I think that is so great. And then you could also build — why I laugh is that the permitting hurdle you would have to go through to build a cormorant nesting platform, which looks like a little box about the size of this that floats out in the water with twigs on it which your neighbor's going to see as an eyesore and floating debris. Why even offer it? The booklet does, however, cover bat nesting boxes and nest boxes for small mammals. It also has a nesting design for barn swallows.

My handout lists all of the booklets that I have recommended and I believe that they're all still available. I think the most expensive one was probably ten to fifteen dollars.

MR. SCHALL: Yes?

AUDIENCE MEMBER: To go back to when you were talking about Rosa rugosa and you said that in your experience you have seen them with some birds that use them as a wildlife habitat?

MR. SCHALL: Oh, yes. Maybe not necessarily a nest, but it certainly forms shelter habitat and screening in coastal environments. They'll work their way through. I agree the drawback is that plastic bags and plastic wrappers can become entangled in the thorns and it's extremely difficult to get the plastic out of them. But I've seen situations where homeowners have actually mowed — at a height of no more than six to eight inches, they've mowed the Rosa rugosa every few years, or they've cut it back to a lower height and the plants have made a fairly vigorous recovery. I think of the Rosa rugosa as more of a vegetative screen. This may not be your purpose, but the plant is highly useful where you wish to control pedestrian traffic or control walking patterns in a coastal environment, but yes, it is useful for this purpose.

Thank you.
MR. O'CONNELL: Thank you Don. OK, lets take a 10 to 15 minute break. The final session after the break will be an open discussion – a time to discuss any of the issues presented today or ask questions you didn't bring up earlier. Also, offer your own experiences with non-structural erosion methods. There's an enormous amount of talent and experience here today. So, please hang around and we'll reconvene in 10 or 15 minutes.

AFTERNOON BREAK
INTERACTIVE PANEL AND OPEN DISCUSSION: QUESTIONS, ANSWERS, OPINIONS, AND COMMENTS
Jim O'Connell, Facilitator

MR. O'CONNELL: Welcome back. This is a very interesting part of all these types of workshops. Basically, just open it up and discuss whatever you learned today. Ask any more questions that you may have. There's a lot of talent in the audience. So ask any questions you have or offer comments.

When an individual was leaving a moment ago he gave me a question. He said this question has been burning in his mind, and asked that I ask it for him. So, I guess I'll just start it off.

It's a question to anybody really. It was something to the effect — how do you reconcile non-structural stabilization with bio-logs, jute netting, re-grading, and planting, if successful, with the adverse impacts it causes. If it's successful, it's preventing the bank from eroding. If it's preventing the bank from eroding, it's preventing sediment from supplying the beach, downdrift beaches, barrier beaches, and dunes, quote, unquote, from the (state) regulations. Anybody want to try?

Joe?

MR. GRADY: The project should be modified so that during large storm events, coastal banks can in fact provide sediment, and then the applicant or rather the homeowner or landowner will have to go back in and refill some of these areas. They should be designed and permitted so that during the large events, the water can, in fact, reach some of the sediment source, pull it out and use it, pump it downstream.

MR. O'CONNELL: So his answer was that the project should be designed to allow erosion of the bank under major storm conditions.

AUDIENCE MEMBER: The whole thing in that statement is "if" — if it were permanent planting on a bank. All these things, of all these people that talked, none of them have been permanent. Is there such a thing?

MR. GRADY: I saw nothing here that was done before the perfect storm. Every site I saw was post-'93. The next perfect storm, it's all gone. Everything we saw today is gone.

MR. O'CONNELL: That's a good point. All the projects that he saw were apparently — appeared to be after the perfect storm, the October, 1991 storm. So, they're going to provide the sediment at some point anyway.

But what about the ten years intervening between 1991 and now — the small storm, the five-year storm, the ten-year storm, the fifteen-year storm where two hundred to five hundred yards may have eroded from the bank. Incrementally, the beach is probably getting lower due to the lack of these small quantities feeding the fronting beach.

MR. BURGESS: I'm going to comment on your question and then ask another one. Mark Burgess with Coastal Engineering.
In a perfect world, the bank should be stabilized and allowed to erode at the same time. That's an impossible thing to do.

The Town of Eastham allows the use of durabags a lot in high-energy areas. And it's my opinion that that is a well-balanced solution because the bags have to be covered in order to provide proper protection from the elements, so that they don't get punctured and fractured and degraded from the sun. The natural storm wave energy will take the sediment that's on top of the bags and take it away. The owner is then therefore required to keep the bag covered, thereby providing some sort of natural source of sediment. Maybe not perfect for the bank eroding in its natural state, but a very middle of the road balance, and that's what we're all here to do really is to try to balance — achieve a balance.

MR. O'CONNELL: David?

AUDIENCE MEMBER: He had a comment about everything was post-perfect storm, but Joe's point is well taken because I do have a fiber roll project that was pre-perfect storm, and it worked just that way: the sediment above the fiber rolls was removed and taken out into the system, but the fiber roll stayed. So it did work, and it can work. It stabilized the toe and it protected the owner's property.

AUDIENCE MEMBER: So modern erosion control is put in these bio-logs, let the big storm take out all the vegetation and soil, and then bring the soil back and re-vegetate it? Put the sand back, establish a location for the toe of the bank, and then keep replenishing the dune, and let the level of the beach drop, and make the beach smaller and smaller and smaller?

This is what happens. I mean, I observed for forty years, and where I grew up used to be a big, wide beach, and now there's rock walls where high tide comes up five feet on the wall. So where do you go with it now?

AUDIENCE MEMBER: That's the point that he was making. There's going to be maintenance, and the homeowner has to understand they're going to be spending some money, right up front.

AUDIENCE MEMBER: If they stack the rocks higher and higher and higher —

AUDIENCE MEMBER: I'm not talking about rocks.

AUDIENCE MEMBER: Rocks are the only thing that work. Sand bags are basically rocks. You know, sand put in a bag is basically a rock that you maintain.

AUDIENCE MEMBER: Right. But rocks don't provide any sediment source. They prevent it from entering the beach area a hundred percent. That's why they work, that's why they're permanent and they really don't require maintenance if they're put in properly. But like I said, the bags are middle of the road because the sediment that has to be put on them every year is something. It may not be everything, but it's something.

MR. BURGESS: My question. Now, a lot of the soft solutions that have been presented today have been presented only in instances of low wave energy. And I'd like to know what would be approved in a high-energy condition. There's a lot of banks in Eastham for one. Direct
velocity storms are discounted. We've got velocity zones to deal with.

My opinion is these soft solutions, they're just not going to hang in there, not long enough to get the bank stabilized — not long enough to vegetate. So I'd like to hear some comments on when do these things — when is it not appropriate, or when are they appropriate? Up to what levels of wave energy can we accept these solutions, since we don't want to throw our plants or clients money in the middle of ocean either.

MR. O'CONNELL: One comment. The word "solution." Are they really solutions? — they're alternatives. Rich?

MR. POOLE: I think we need to go back to what Wendy was talking about this morning, and look at things more regionally — within the whole town and things like that. Because I've watched Duxbury Beach over the last thirty or thirty-five years and watched the flats behind it. You know what a beach is, okay? And I think one of the most important things we need to talk about, and this may be a topic of a future conference or whatever, is the concept of beach nourishment, which is just beginning to take hold here in Massachusetts. And we're going to see it in Hull and maybe a few other places. But since we're cutting off the source of sand that nourishes beaches and in cases where we've had washover in '78 and '91 and other places, I think it's time to talk about recapturing some of that sand from areas that — the same sand, and getting it back into the system. Put it out there and let it do its thing right around the hook at the Cape.

So that's an observation.

MR. O'CONNELL: Should we get the folks who built the updrift seawalls to all come in collectively and do the beach nourishment at Duxbury Beach? Because we know who built most of the seawalls in Scituate and Marshfield.

AUDIENCE MEMBER: Right, exactly. I think you would agree with me that part of our problem in Duxbury is the fact that we're being starved because of the walls.

MR. O'CONNELL: Most definitely.

AUDIENCE MEMBER: So that's maybe something we need to look at in a future get-together.

MR. O'CONNELL: You've lost a significant amount of sand.

Bill?

MR. CLARK: Well, before my question, to follow up on that. Any recent permitting (of armoring coastal banks) requires beach nourishment. My clients tell me that, I think, at least for five years, maybe ten years, we've been requiring beach nourishment for every revetment.

The question is what's the difference between burying rocks with sand and planting it or burying coconut fiber rolls with sand and planting it? I don't see any difference. The function of a coastal bank is to provide sediment. It's still providing sediment whether it's rocks under there or coconut fiber rolls. We had this conversation during the break, so I'm curious, what's the difference?

You talk about soft solutions. You bring a crane in there, it's an engineered structure, and
you start moving things around with the crane, if you put rocks there or whatever, I'm just curi-
ous, what’s the difference?

MR. O'CONNELL: I’m going to make one comment, Bill, and then I’d like somebody to
address that. It gets back to your initial comment. If the IPCC’s predictions are correct, and we
do get an accelerated rise in sea level in an area that’s already half armored, I’ll use the eastern
shore of Cape Cod Bay in Eastham, for an example. There are a lot of revetments along that
shore. It also has sand bags or dura-bags. We know that there’s forced high water up against some
of the revetments. Eventually, there’s going to be forced high water up against the dura-bags.
You’re not going to be able to maintain that material cover over the bags. So I think your idea of
putting material back into the system covering the bags is going to become more temporary. In
other words, it’s going to be removed more frequently, but you’re still going to be putting it back
in the system. So there’s going to become a point where you’re just putting the sand in the water.
And that point I don’t think is too far in the future. So, if somebody else wants to address that.
Leslie?

MS. FIELDS: I know that our firm has done a few large beach nourishment projects around
the Cape. We’re big proponents of beach nourishment, and I think you’re going to see a lot of it
in the future.

And in many cases, we’ve proposed beach nourishment in conjunction with fiber rolls,
and almost always in conjunction with revetments or some hardened structure because of the
Conservation Commission’s requirement, and because we realize that it’s a good thing for the
sediment supply. And I had mentioned that in one of the slides that I had showed earlier is that
we have tried to get our clients to buy into either salt marsh restoration or beach nourishment in
conjunction with the fiber rolls. And in that case, it was just a cost issue, and they just didn’t
want to pay for both solutions.

So I agree, beach nourishment is definitely a good thing in many cases, and if you’re going
do a future seminar on beach nourishment, we would love to make a presentation.

MR. O'CONNELL: Well, that’s obviously the first suggestion on the next workshop. Al?

AUDIENCE MEMBER: I think Bill actually answered it. A lot of the conservation commis-
sions, when you do these — anything that’s going to cut off the sediment source, you have to
calculate how much sediment theoretically you might have gotten every year, and as part of the
order of conditions there had to be a beach nourishment project each and every year. And so
they replace it that way.

MR. O'CONNELL: Yes, most of the commissions that I’m aware of are now requiring that.

MR. O'CONNELL: Dennis?

AUDIENCE MEMBER: Has anyone here had any experience with retroactively having
problems as Eastham is — that most of these revetments go back pre-nourishment requirements.
We might have a handle on the newer projects; but the vast majority of them are older projects
and so far there has not been a mechanism for retroactively requiring nourishment.
MR. O’CONNELL: Actually, that’s part of state policy, so it could be considered. But it’s only a policy. Whether or not the commissions are doing it, I’m not sure. I believe DEP is unclear about the legality of requiring nourishment for reconstruction of a revetment or just resetting riprap when it wasn’t required in the original permit. We would have to get that from DEP. Anyone from DEP?

Kevin?

MR. MOONEY: Kevin Mooney, Division of Waterways. I know that when we do projects now, we require a maintenance program. We had a project that we canceled down in Harwich, but it was a very intricate project that we were looking at: rebuilding a jetty, reestablishing the dunes, doing jetty maintenance, doing beach nourishment, and just tying everything together with dredging of the harbor. The maintenance program that we were developing there required you to go out every year and do a survey to see where your erosion is, where your accretion is, and move material back into the eroded area so that you can still feed the whole system, and make sure that your beach plantings are fine.

But everything comes down to maintenance. And that’s the one thing no matter what system you’re using, whether it’s a hard structure or a soft structure, whatever — maintenance. There’s going to be different issues with all things, but you have to maintain it. If you don’t maintain it, it’s not going to be there to protect you when you need it.

Everything that we use on the coast is sacrificial. One good storm, it’s gone. But if you maintain it, that’s going to go before properties. So the key that we use now is we require the maintenance of these areas. And a lot of the conservation commissions that are requiring nourishment are getting the idea from my office to push this because we work with DEP, and with the Corps, to try to establish things. When you get a license to establish a profile on a beach, that’s considered a structure, even though it’s sand. You can maintain that profile without going through the whole permitting process again. And that’s something that we did down at the Sylvia State Beach. That’s where I came across it at Sylvia Beach. That’s where we come in and maintain it without going through the process every single time, recognizing that it is a structure and it has to be maintained to get the licenses. So that’s what we do.

AUDIENCE MEMBER: Excuse me. When you say “we,” who do you mean exactly?

AUDIENCE MEMBER: Commonwealth of Mass. DEM, Waterways.

We’re those nice people that dredge all your harbors.

MR. JOYCE: Chris Joyce, Joyce Landscaping. My question is, there’s been so many different theories today on nourishment, beach grass, and does it work, does it not work, should it be fertilized, does it all die. And this is for Joe Grady. Obviously you’ve done a large-scale Cape beach grass planting in Duxbury Beach. Why have you been so successful where others haven’t? What’s your reason for your success?

MR. GRADY: Plant it early in the season and fertilize it.

MR. JOYCE: You fertilize it once annually?
MR. GRADY: Once a year, with very slow-release nitrogen, twenty pounds per acre.
MR. JOYCE: What do you find the most optimum time to get that beach grass in?
MR. GRADY: We'll be planting March 23rd this year.
MR. JOYCE: And how long will you go for?
MR. GRADY: That's it. It's a one-day event.
MR. JOYCE: You do it in one day?
MR. GRADY: Yeah. I plant it as early as you can.
MR. JOYCE: No later than that day?
MR. GRADY: I wouldn't recommend past April 1st with the weather conditions we're having.
MR. JOYCE: Are you a proponent of spring seeding rather than fall seeding?
MR. GRADY: Yes.
MR. JOYCE: So it doesn't have the whole winter to try to survive.
MR. GRADY: In the southern part of the country, it's traditionally done in the fall. New England traditionally plants in the springtime because traditionally the winter storms cause the most havoc in New England, and you don't want to lose your material by a storm in the wintertime that you just planted.
MR. JOYCE: What percent of dieback do you have?
MR. GRADY: The first year, next to none, as long as you continue to fertilize it on a regular basis. You know, we can live with maybe twenty percent. We find that acceptable.
MR. JOYCE: As a conservation agent within your town, as well as being a trustee of the beach, I know in our town, you start talking fertilization on a coastal bank, people start — hair starts standing on end. Today I've heard so many different theories, well, in this town it's okay. Don't you think statewide there should be a theory on that instead of having it all each conservation agency approaching it different?
MR. GRADY: Well, I think that's one of the reasons for processes like this, is to try to spread the word on things that have worked in other places. But in Massachusetts, home rule and individual cities and town decisions are a very strong thing, and it will always be that way. Again, I have to advocate a slow-release nitrogen. Nitrogen is a real problem in a lot of embayments, so they don't want people just pouring nitrogen all over the place next to our coastal waters. You've got to be very careful with nitrogen.
MR. JOYCE: How many pounds per acre?
MR. GRADY: Twenty pounds. For the rest of you, what's traditionally put on a lawn is something around eighty pounds an acre, so twenty or twenty-five percent, which we'd normally apply. And that was work that was done by Carl Rask of the Cape Cod Cooperative Extension, ten, fifteen years ago. They did some experiments to try to find out what the optimal rate was. So it's just a light application.
MR. O'CONNELL: Again, it's coming down to be site specific. If you have an embayment
that’s not well flushed, use of slow-release seems appropriate, and as little as possible. Tim showed one slide where he used a hundred pounds an acre — that’s the open ocean end of the spectrum that’s going to flush immediately.

One last comment?

Tim Friary?

MR. FRIARY: I always use quick-release. Right before a storm, in the springtime, in April, I like to get it right to the roots when it rains. I mean, that’s the USDA spec too. That’s what they experimented with and that’s what they came up with that worked. The quick-release is what they fertilize with.

AUDIENCE MEMBER: The common mistake with fertilizer, however, is when you’re looking at pounds per acre, you have to remember the percentage of nitrogen. So if you’re choosing a hundred pounds per acre at ten percent nitrogen, that’s only ten pounds of actual nitrogen per acre.

MR. O'CONNELL: Good point.

AUDIENCE MEMBER: And that's when we had trucked-in soil to deal with, which is very, very sterile.

MR. CLARK: So you have to be careful when you start talking poundage. You have to look at the actual active ingredient.

AUDIENCE MEMBER: And calculate the dosage.

MR. CLARK: Calculate the percentage of active ingredient being applied, and then what percentage of that is actually either slow- or quick-release. So, it makes a difference. So you can't really compare apples and oranges. You have to know all the facts. That's the trouble with using all these numbers.

MR. O'CONNELL: As the Director of Cape Cod Cooperative Extension, Bill gets the final comment.

I want to thank you all for coming. I want to particularly thank the speakers for taking the time to put a presentation together to spark these informative discussions. It can take a great deal of time and effort to put presentations together — so thanks! I hope you enjoyed yourselves and more importantly learned ideas from each other that you can carry into the field. We, and the coastal environment, can all only benefit from sharing our collective experiences.

Thank you all very much. We’ll be putting proceedings together to document these important discussions. Continue to share your knowledge.

(Whereupon the proceedings concluded.)
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