Data Checklists for the Delineation of Resource Areas

Land Under the Ocean

Coastal Beaches

Coastal Dunes

Barrier Beaches

Coastal Banks

Rocky Intertidal Shores

Salt Marshes

Land Subject to Coastal Storm Flowage

Land Under the Ocean Delineation Checklist

Check all that apply:

Indicators of the Seaward Boundary of Land Under the Ocean	If **yes**:
❑ Does hydrographic survey data indicate that the project location is *beyond* (seaward of) the boundary of the municipality (generally 3 miles offshore)?	The project is not within land under the ocean and not subject to the Wetlands Protection Act.
❑ Have you identified the nearshore area contour line that is applicable to your region and does the hydrographic survey data indicate that the project location is *beyond* (seaward of) the boundary of this contour line, but *within* (landward of) the boundaries of the municipality?	The project is within land under the ocean, but not within the nearshore area (and thus is not likely to be significant to the interests of storm damage prevention and flood control).
❑ Have you identified the nearshore area contour line that is applicable to your region and does the hydrographic survey data indicate that the project location is *within* (landward of) the boundary of this contour line and *within* (landward of) the boundaries of the municipality?	The project is within the nearshore area (and thus is likely to be significant to the interests of storm damage prevention and flood control).
Indicators of the Landward Boundary of Land Under the Ocean	If **yes**:
❑ Do you have an approximate idea of the location of the mean low water line?	You have an idea of the landward boundary of land under the ocean.
If you do not have an approximate idea of mean low water, observe obvious characteristics of land under the ocean and beach, tidal flat, or rocky intertidal shore (as listed below) and work your way to the middle to identify the landward boundary of land under the ocean. The characteristics of the resource areas that are listed below are described in more detail in this section and in the sections for coastal beaches (beginning on page 1-8) and rocky intertidal shores (beginning on page 1-57).	
❑ At a typical low tide, are your feet in the water?	You are on land under the ocean.
❑ At a typical low tide, are you standing on a tidal flat, nearshore sandbar, or wet sand area? *or* ❑ Are you standing on sediments that look like they have been primarily reworked by waves and tides? Do you see: ❑ rill marks, ❑ ridges and runnels, ❑ swash marks, ❑ beach cusps (horns and embayments), ❑ berms, and/or ❑ wrack lines from the most recent high tides?	You are on a coastal beach (or tidal flat that precedes a salt marsh)
❑ At a typical low tide, are you standing on a rocky shore with a predominance of boulders or bedrock outcrops?	You are on a rocky intertidal shore.
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

- ❑ Other observations:

Coastal Beaches Delineation Checklist

Check all that apply:

Indicators of the Seaward Boundary of a Coastal Beach (These indicators should only be used for an approximate boundary—a survey should be required for an exact delineation.)	If **yes**:
❑ Do you have an approximate idea of the location of the mean low water line?	You have an idea of the seaward boundary of the coastal beach.
If you do not have an approximate idea of mean low water, observe obvious characteristics of land under the ocean and beach (as listed below) and work your way to the middle to identify the seaward boundary of the coastal beach. The characteristics of these resource areas are described in more detail in this section and the section for land under the ocean beginning on page 1-3.	
❑ At a typical low tide, are your feet in water?	You are on land under the ocean.
❑ At a typical low tide, are you standing on a tidal flat, nearshore sandbar, or wet sand area?	You are on a coastal beach.
Indicators of the Landward Boundary of a Coastal Beach with a Coastal Dune	If **yes**:
❑ Can you discern a change in slope to a steeper, seaward-facing slope of a hill, mound, or ridge landform? *and* ❑ Have you found the most recent high tide wrack line?	Look for the beach/dune boundary landward of the most recent high tide wrack line and where there is a change in slope.
If there is not a distinct change in slope that appears to be a logical location for the beach/dune boundary, you should observe obvious characteristics of beaches and dunes and work your way to the middle to identify the landward boundary of the coastal beach. The characteristics of these resource areas are described in more detail in this section and in the section for coastal dunes beginning on page 1-16.	
❑ Are you standing on sediments that look like they have been primarily reworked by waves and tides? Do you see: ❑ rill marks, ❑ ridges and runnels, ❑ swash marks, ❑ beach cusps (horns and embayments), and/or ❑ wrack lines from most recent high tide?	You are on a coastal beach.
❑ Are you standing on a relatively flat terrace landward of the swash zone formed by deposition of beach sediments by waves or tides, which is relatively devoid of vegetation (or only sparse vegetation is present)?	You are likely on a coastal berm or backbeach, which is part of the natural form of a coastal beach.

Coastal Beaches Delineation Checklist

❑ Are you standing on a hill, mound, or ridge of sediments landward of a coastal beach, which look like they have been primarily reworked by wind or overwash? Do you see: ❑ windblown (dry) sand ripples, ❑ windblown sand accumulation around wrack, pebbles, and shells, ❑ finer-grained sand than the beach (on beaches and dunes that are primarily sand), ❑ a fan-shaped deposit of sand, gravel, and/or cobble landward of the mean high tide line (i.e., overwash fan), and/or ❑ the presence of vegetation that traps and holds windblown sand? Dune vegetation may include: beachgrass (*Ammophila breviligulata*), beach pea (*Lathyrus japonicus*), poison ivy (*Toxicodendron radicans*), seaside goldenrod (*Solidago sempervirens*), rugosa rose (*Rosa rugosa*), and others.	You are likely on a coastal dune.
Indicators of the Landward Boundary of a Coastal Beach with Coastal Bank or Man-Made Structure	If **yes**:
The characteristics of the following are described in more detail in the section for coastal banks beginning on page 1-51.	
❑ Is there an abrupt change in topography—to a steep, seaward-facing slope primarily of glacial origin (typically poorly sorted sediments)?	You have located the landward boundary of the coastal beach with coastal bank (see the coastal banks section beginning on page 1-51 for more details on bank delineation—not all slopes will qualify as coastal banks).
❑ Is there a coastal engineering structure built on an adjacent landward landform?	You have located the boundary of the coastal beach with a man-made structure.
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

Coastal Dunes Delineation Checklist

Check all that apply:

Indicators of the Seaward Boundary of a Coastal Dune	If **yes**:
❑ Can you discern a change in slope to a steeper, seaward-facing slope of a hill, mound, or ridge landform? *and* ❑ Have you found the most recent high tide wrack line?	Look for the beach/dune boundary landward of the most recent high tide wrack line and where there is a change in slope.
If there is not a distinct change in slope that appears to be a logical location for the beach/dune boundary, you should observe obvious characteristics of beaches and dunes (as listed below) and work your way to the middle to identify the seaward boundary of coastal dune. The characteristics of these resource areas are described in more detail in this section and in the coastal beaches section beginning on page 1-8.	
❑ Are you standing on sediments that look like they have been primarily reworked by waves and tides? Do you see: ❑ rill marks, ❑ ridges and runnels, ❑ swash marks, ❑ beach cusps (horns and embayments), and/or ❑ wrack lines from the most recent high tides?	You are on a coastal beach.
❑ Are you standing on a relatively flat terrace landward of the swash zone formed by deposition of beach sediments by waves or tides, which is relatively devoid of vegetation (or only sparse vegetation is present)?	You are likely on a coastal berm or backbeach, which is part of the natural form of a coastal beach.
❑ Are you standing on sediments (such as cobble or gravel) that look like they have been primarily reworked by overwash? *and* ❑ Can you discern a change in topography to a steeper, seaward-facing slope of a hill, mound, or ridge landform that lies landward of a coastal beach?	You are likely on a coastal dune.
❑ Are you standing on a hill, mound, or ridge of sediments (such as sand) landward of a coastal beach, which look like they have been primarily reworked by wind or overwash? Do you see: ❑ windblown (dry) sand ripples, ❑ windblown sand accumulation around wrack, pebbles, and shells, ❑ finer-grained sand than the beach (on beaches and dunes that are primarily sand), ❑ a fan-shaped deposit of sand, gravel, and/or cobble landward of the most recent high tide line (i.e., overwash fan), and/or ❑ the presence of vegetation that traps and holds windblown sand? Dune vegetation may include: beachgrass (*Ammophila breviligulata*), beach pea (*Lathyrus japonicus*), poison ivy (*Toxicodendron radicans*), seaside goldenrod (*Solidago sempervirens*), and rugosa rose (*Rosa rugosa*), or other.	You are likely on a coastal dune.

Coastal Dunes Delineation Checklist

Indicators of the Landward Boundary of a Coastal Dune	If **yes**:
❑ Are the subsurface sediments (given that an organic soil horizon may have formed or the weathered surface may disguise the underlying landform) those that have been deposited by wind or storm-wave overwash? Are the sediments: ❑ sorted and layered, representing periods of deposition by wind and waves, ❑ rounded, and ❑ of similar range in size (though generally finer grained) to those sediments on the beach? *and* ❑ Are the windblown deposits part of a hill, mound, or ridge that is landward of a coastal beach? (A Commission should review profiles of the surficial and underlying sediments to characterize sediments and determine overall topography of the landform.) *and* ❑ Does the vegetation consist of dune-type growth, such as beachgrass (*Ammophila breviligulata*), rugosa rose (*Rosa rugosa*), beach plum (*Prunus maritima*), bayberry (*Myrica pensylvanica*), or more complex and dense upland plants, shrub growth, and low forests?	The landform is a coastal dune (either a primary or secondary dune system).
❑ Are you standing at what appears to be a water body within dune ridges? *and* ❑ Do you see wetland vegetation?	You are likely within a hollow of the dune, which may contain a bordering vegetated wetland, isolated wetland, or vernal pool (and does not necessarily demarcate the edge of coastal dune).
❑ Are you standing in a low flat spot landward of a dune that is composed of windblown or wave deposited sediments?	You are likely between a primary dune and a secondary dune or between two secondary dunes, either of which are coastal dune by definition. Look at subsurface sediments and profiles to determine landward extent of dune. (See Profile B in Figure 1.5 on page 1-30.)
❑ Are you within a barrier beach but not on a coastal beach, glacial landform, or vegetated wetland/waterbody?	You are on a coastal dune within the barrier beach (see the barrier beaches section beginning on page 1-42).
❑ Are the subsurface sediments glacial in origin (typically poorly sorted sediments)?	The landform is a coastal bank or an upland.
❑ Are the subsurface sediments those that have been deposited by wind or storm-wave overwash? *and* ❑ Do these windblown deposits overlie glacial material? *and* ❑ Do these deposits appear to be part of the hill, mound, or ridge of the coastal dune? (A Commission should review profiles of the surficial and underlying sediments to characterize sediments and determine overall topography of the landform.)	This portion of the landform is the tapering edge of the coastal dune, which still meets the regulatory definition of coastal dune. (See Profiles B and C in Figure 1.5 on pages 1-30 and 1-31.)
❑ Are the subsurface sediments those that have been deposited by wind or storm-wave overwash? *and* ❑ Do these windblown deposits overlie glacial material? *and* ❑ Do these deposits follow the underlying topography of the glacial material with a relatively consistent thickness, and appear not to be part of the hill, mound, or ridge of the coastal dune? (A Commission should review profiles of the surficial and underlying sediments to characterize sediments and determine overall topography of the landform.	These deposits constitute a veneer of sand *landward of* the landward edge of coastal dune (i.e., this area may not constitute a regulatory coastal dune). (See Profile A in Figure 1.5 on page 1-29.)

Coastal Dunes Delineation Checklist

Indicators of a Non-Regulatory Dune (based on the definition)	If **yes**:
❑ Are the subsurface sediments those that have been deposited by wind or storm-wave overwash? *and* ❑ Do these windblown deposits overlie glacial material? *and* ❑ Do these deposits appear to be part of the hill, mound, or ridge of the coastal dune? *but* ❑ Do these deposits border (on the seaward side) something *other than* another dune or the coastal beach, such as glacial material? *and* ❑ Are these deposits landward of the 100-year floodplain?	This landform is not a regulatory coastal dune because it does not border the ocean or border the coastal beach that borders the ocean. You are likely on a cliff-top dune that *does not* meet the regulatory definition of coastal dune.
Indicators of a Regulatory/Non-Regulatory Dune (based on the function)	If **yes**:
For cases of artificial fill: ❑ Is there evidence of two-way exchange of sediment between the coastal beach and the landform? If not, would this occur during a large coastal storm event? *and* ❑ Is the landform conforming and reshaping to natural wind and water flow processes or would it in a coastal storm event? *and* ❑ Is the landform migrating landward or laterally in response to wind, wave, or tides? *Or*	The artificial fill meets the regulatory definition of coastal dune.
❑ Is the landform eroding and providing sediment to the beach system in a manner consistent with a sediment-source type coastal bank?	The artificial fill may meet the regulatory definition of a coastal bank (see coastal banks section beginning on page 1-51).
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

- ❑ Other observations:

Barrier Beaches Delineation Checklist

Check all that apply:

Indicators of a Barrier Beach System	If **yes**:
❑ Is the landform identified on the CZM Barrier Beach Inventory Project as a barrier unit, or is the landform labeled as a state-designated barrier beach within the data layers of MassGIS's Oliver or CZM's MORIS online viewing tools? *and* ❑ Looking at the overall landform, do you see a low-lying beach/dune system that is separated from the mainland by a narrow body of fresh, brackish, or saline water or a marsh system?	You have identified a barrier beach.* *Use these maps to establish general landform only.*
Indicators of the Seaward Boundary of a Barrier Beach (These indicators should only be used for an approximate boundary—a survey should be required for an exact delineation.)	If **yes**:
❑ Do you have an approximate idea of the location of the mean low water line?	You have an idea of the seaward boundary of the coastal beach/barrier beach.
If you do not have an approximate idea of mean low water, observe obvious characteristics of land under the ocean and beach (as listed below) and work your way to the middle to identify the seaward boundary of the barrier beach. The characteristics of these resource areas are described in more detail in the sections for land under the ocean (beginning on page 1-3) and coastal beaches (beginning on page 1-8).	
❑ At a typical low tide, are your feet in the water?	You are on land under the ocean.
❑ At a typical low tide, are you standing on a tidal flat, nearshore sandbar, or wet sand area?	You are on a coastal beach, as part of the barrier beach.
Indicators of Resource Areas within a Barrier Beach	If **yes**:
See Beach and Dune Data Checklist for indicators of beach and dune resource areas and then continue below.	
❑ If the landform is connected to the mainland, are the coastal beaches and dunes seaward of the waterbody or marsh that separates the barrier from the mainland?	You have identified beaches and dunes *as part of* the barrier beach.
If you have identified beaches and dunes *as part of* the barrier beach: ❑ Does the site contain forest-type vegetation? *and* ❑ Are the underlying sediments those that have been deposited by wind or storm-wave overwash? *Or*	You are within a maritime forest, *as part of* the dune system of a barrier beach.
❑ Are you standing at what appears to be a water body within dune ridges? *or* ❑ Are you standing on what appears to be freshwater wetland vegetation within dune ridges? *Or*	You are likely within a hollow of the dune, which may contain a vegetated wetland or vernal pool (and does not necessarily demarcate the landward boundary of barrier beach).

*Unit Tr-2 in the Barrier Beach Inventory Project has been de-designated as a barrier beach.

Barrier Beaches Delineation Checklist

❑ Are you standing on a marsh *within a tidal creek or inlet* of the barrier beach, which shows evidence of salt-tolerant vegetation, such as: ❑ Smooth cordgrass (*Spartina alterniflora),* and ❑ Saltmeadow cordgrass (*Spartina patens)*?	You are standing on a salt marsh *within* the barrier beach (and does not necessarily demarcate the landward boundary of barrier beach).
Indicators of the Landward Boundary of a Barrier Beach	If **yes**:
❑ Are you standing on a tidal mudflat on the landward shore of the barrier beach?	You are standing on the barrier beach. The mean low water line of the tidal flat is the boundary of the barrier beach.
❑ Are you standing on a marsh separating the barrier from the mainland, which shows evidence of salt-tolerant vegetation, such as: ❑ Smooth cordgrass (*Spartina alterniflora),* and ❑ Saltmeadow cordgrass (*Spartina patens)*?	You are on a salt marsh that is *not part* of the barrier beach. The beginning of salt marsh vegetation is the boundary of the barrier beach.
Indicators of the Lateral Boundary of a Barrier Beach	If **yes**:
If the landform is connected to the mainland: ❑ Are the coastal beaches and dunes seaward of the upland? *Or*	You are on coastal beaches and dunes that are *not part* of the barrier beach.
❑ Are you standing on sediments (or bedrock) that look like they are glacial in origin (typically poorly sorted sediments) or that have deep organic soil horizons? *Or*	You are on a coastal bank or an upland area that is *not part* of the barrier beach.
❑ Are you standing on bedrock (more than a small outcrop)?	You are on bedrock or an upland area that is *not part* of the barrier beach.
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

Coastal Bank Delineation Checklist

Check all that apply:

Indicators of a Coastal Bank	If **yes**:
See other resource area Data Checklists to determine the landward boundaries for beach, dune, salt marsh, rocky intertidal shore, or land subject to coastal storm flowage, and then continue below. Keep in mind that when determining slope, the profile or transect lines must be perpendicular to the contour lines.	
❑ Is there an abrupt change in topography—to a steep seaward-facing slope (steeper than 10:1) or elevated landform that does not meet the criteria for beaches and dunes? *and* ❑ Does the 100-year flood (1%-annual-chance flood) reach this elevated landform? *and* ❑ Is the landform immediately landward of a beach, dune, salt marsh, or rocky intertidal shore; or a body of water such as a lake, stream, or land under a salt pond; or a lowland that is tidal or associated with coastal storm events up to the 100-year storm (1%-annual-chance flood) or storm of record? *and* ❑ Are the underlying sediments on the slope or elevated landform primarily glacial deposits (typically poorly sorted sediments)? *or* ❑ Does the landform consist of artificial fill that serves the functions of a coastal bank (sediment source or vertical buffer)?	The landform is a coastal bank.
Indicators of the Seaward Boundary of a Coastal Bank	If **yes**:
❑ Have you found the landward boundary of the adjacent (seaward) coastal resource area (i.e., beach, dune, salt marsh, or rocky intertidal shore; or a body of water such as a lake, stream, or land under a salt pond; or a lowland that is tidal or associated with coastal storm events up to the 100-year storm or storm of record)? *and* ❑ Does this boundary border a landform that meets the criteria listed above?	You have found the seaward boundary of the coastal bank, which is often marked by an abrupt change in topography to a steep facing slope (steeper than 10:1). See the applicable sections in Chapter 1 to help refine the landward boundaries of the other coastal resource areas.
Indicators of the Landward Boundary of a Coastal Bank (Top of Coastal Bank)	If **yes**:
❑ Is the slope steeper than or equal to 10:1 but less than 4:1?	The 100-year flood elevation *is* the top of coastal bank.
❑ Is the slope steeper than or equal to 4:1?	The top of coastal bank is *above* the 100-year flood elevation and at the point where the slope becomes less than 4:1.
❑ Is there a coastal bank separated by land subject to coastal storm flowage that extends to another rise steeper than 10:1?	The area contains multiple coastal banks. Commissions should be careful to delineate the most landward coastal bank.
❑ Is there a small break in slope, such as at the location of the top of a seawall or a footpath, that is immediately followed landward by a return to a steep slope?	This is a human alteration and does not constitute a change in slope of the underlying landform or the top of coastal bank. Determine the slope of the *overall* landform, not the microtopography.
❑ Are field observations consistent with surveys, maps, and other references?	

- ❑ Other observations:

Rocky Intertidal Shores Delineation Checklist

Check all that apply:

Indicators of a Rocky Intertidal Shore	If **yes**:
❑ Are you standing between the mean low and high water elevation on rocky areas (e.g., pebbles, cobbles, and boulders) that look like they have been primarily reworked by waves, tides, or storm events?	You are on a rocky intertidal shore as part of the coastal beach.
❑ Are you standing between the mean low and high water elevation on rocky areas that look like they have been shaped and deposited by glacial processes? *and* ❑ Are you standing on rocky areas that tend to be more irregular in topography and have a greater predominance of bedrock outcrops or boulders that remain fairly static? *and* ❑ Does the relatively static nature of the rock material allow for the growth and survival of plants and animals that are specially adapted to live in the tidal environment?	You are on a rocky intertidal shore.
Indicators of the Seaward Boundary of a Rocky Intertidal Shore	If **yes**:
❑ At a typical low tide, are your feet in the water?	You are standing on land under the ocean (the subtidal region, which is not part of the rocky intertidal shore).
❑ At a typical low tide, are you standing on a wet pebble, cobble, or rocky area with a predominance of boulders or bedrock outcrops? *or* ❑ At a typical low tide, are you standing on a rocky area with a predominance of boulders or bedrock outcrops that are dominated by species such as: ❑ mussels (*Mytilus edulis)*, ❑ Irish moss (*Chondrus crispus*), ❑ rock weed (*Fucus* spp.), ❑ barnacles (*Balanus balanoides)*, ❑ snails and limpets, ❑ small anemones, and ❑ shore crabs?	You are standing on the rocky intertidal shore.
Indicators of the Landward Boundary of a Rocky Intertidal Shore	If **yes**:
❑ Are you standing on a rocky area with a predominance of boulders and bedrock outcrops that are dominated by barnacles (*Balancus balanoides*)? *and/or* ❑ At mean high tide, are your feet wet?	You are standing on the rocky intertidal shore.
❑ At mean high tide, are you standing on rocks exposed to the air that are wet from sea spray or wave splash? *and* ❑ Are there low densities of species that were identified above?	You are standing in the splash zone, which is not the rocky intertidal shore. The splash zone is part of the adjacent resource area (i.e., coastal beach, coastal bank).
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

- ❑ Other observations:

Salt Marshes Delineation Checklist

Check all that apply:

<table>
<tr><th>Indicators of a Salt Marsh</th><th>If yes:</th></tr>
<tr><td>Are you standing on a coastal wetland (i.e., wetland subject to tidal action or coastal storm flowage) and:
❑ Is the area below (i.e., seaward of) the highest spring tide line, and if so:
❑ Is the area characterized by plants that are well adapted to or prefer living in saline soils?
These plants may include:
❑ salt meadow grass (Spartina patens),
❑ spikegrass (Distichlis spicata),
❑ blackgrass (Juncus gerardii),
❑ marsh elder (Iva frutescens),
❑ glass worts (Salicornia sp.),
❑ sea lavender (Limonium carolinianum),
❑ sea blite (Suaeda maritima),
❑ salt marsh aster (Aster maritima),
❑ little sea-pink (Sabatia stellaris), and
❑ common reed (Phragmites)? and/or
❑ Have you identified peat areas that may have been denuded of vegetation through natural or artificial causes but may still contain rhizomes and other subsurface plant material? and/or
❑ Have you identified salt marsh features, such as drainage ditches, salt pannes, salt pools, and creeks that are substantially surrounded by salt marsh vegetation and are relatively drained at mean low tide?
or</td><td>You may be standing on a salt marsh. (See indicators for landward and seaward boundaries below to make the determination.)</td></tr>
<tr><td>Are you standing on a coastal wetland (i.e., wetland subject to tidal action or coastal storm flowage) and:
❑ Is the area above (i.e., landward of) the highest spring tide line? or
❑ Is the area below (i.e., seaward of) the highest spring tide line, but exhibits none of the characteristics of a salt marsh listed above (i.e., plants, peat, or salt marsh features)? (See Indicators of Landward Boundary of Salt Marsh below for more information about the threshold of plant cover.)</td><td>You are standing on a coastal wetland (or a freshwater wetland or a bordering vegetated wetland), but not a salt marsh.</td></tr>
<tr><td>❑ Are you standing on a wetland associated with inland waters, which is not subject to tidal action or coastal storm flowage?</td><td>You are standing on a freshwater wetland or a bordering vegetated wetland that is not a salt marsh.</td></tr>
<tr><th>Indicators of the Landward Boundary of a Salt Marsh</th><th>If yes:</th></tr>
<tr><td>❑ Have you identified the highest spring tide of the year from tide charts and made observations of the high tide wrack lines? and
❑ Have you correlated this line to the plan and found and ground-truthed this line in the field?</td><td>You are at the uppermost possible limit of the salt marsh (the boundary will be no further landward, but may be further seaward).</td></tr>
</table>

Salt Marshes Delineation Checklist

❑ While standing at the line for highest spring tide of the year, have you identified a plant count or percent cover of *more than* 50 percent of salt-tolerant wetland vegetation, such as: ❑ salt meadow grass (*Spartina patens*), ❑ spikegrass (*Distichlis spicata*), ❑ blackgrass (*Juncus gerardii*), ❑ marsh elder (*Iva frutescens*), ❑ glass worts (*Salicornia sp*.), ❑ sea lavender (*Limonium carolinianum*), ❑ sea blite (*Suaeda maritima*), ❑ salt marsh aster (*Aster maritima*), ❑ little sea-pink (*Sabatia stellaris*), and ❑ common reed (*Phragmites*)?	You are in a salt marsh. The highest spring tide line will mark the landward boundary of the salt marsh.
❑ While standing at the line for highest spring tide of the year, have you identified a plant count or percent cover of *less than* 50 percent of salt-tolerant wetland vegetation, such as: ❑ salt meadow grass (*Spartina patens*), ❑ spikegrass (*Distichlis spicata*), ❑ blackgrass (*Juncus gerardii*), ❑ marsh elder (*Iva frutescens*), ❑ glass worts (*Salicornia sp*.), ❑ sea lavender (*Limonium carolinianum*), ❑ sea blite (*Suaeda maritima*), ❑ salt marsh aster (*Aster maritima*), ❑ little sea-pink (*Sabatia stellaris*), and ❑ common reed (*Phragmites*)?	You are not in a salt marsh. Continue seaward until you find the area where you can identify a plant count or percent cover of *more than* 50 percent of salt-tolerant wetland vegetation. This will mark your landward boundary of salt marsh.
❑ While standing at the line for highest spring tide of the year, have you identified that the plant count or percent cover of species of *freshwater wetland indictors* is more than 50 percent?	You are on a freshwater wetland or a bordering vegetated wetland. Continue seaward until you find the area where you can identify a plant count or percent cover of more than 50 percent of salt-tolerant wetland vegetation. This will mark your landward boundary of salt marsh.
Indicators of the Seaward Boundary of a Salt Marsh	If **yes**:
Observe obvious characteristics of the low marsh and the coastal beach and work your way to the middle of these points to find the seaward boundary of salt marsh. The characteristics of these resource areas can be found in more detail in this section and the coastal beaches section beginning on page 1-8.	
❑ Are you standing on salt-tolerant wetland vegetation, dominated by salt marsh cordgrass (*Spartina alterniflora*)? *or* ❑ Are you standing on peat, which once supported this low marsh vegetation?	You are on the low marsh, as part of a salt marsh.
❑ Are you standing on a tidal flat?	You are on a coastal beach, as defined by the Regulations.
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

Land Subject to Coastal Storm Flowage Delineation Checklist

Check all that apply:

Considerations When Reviewing the Boundaries of Land Subject to Coastal Storm Flowage	
❑ Have you considered the following evidence to determine the spatial extent of land subject to coastal storm flowage: 1) Flood Insurance Rate Maps (FIRMs), 2) Preliminary FIRMs, 3) Flood Insurance Studies (FISs), 4) National Flood Hazard Layer (NFHL) for: • Letters of Map Change for the area, including Letters of Map Revision (LOMR) or Letters of Map Amendment (LOMA), • Limit of Moderate Wave Action (LiMWA), *in combination with:* 5) Historic flooding events and storm and surges of record, 6) Engineering data, 7) Field indicators, and 8) Other data sources, such as the Shoreline Change Maps, South Shore Hazards Characterization Atlas, and the MyCoast: Massachusetts web portal. *In addition, for coastal dunes:* 1) Landward boundaries of primary dunes, and 2) Volume of primary dunes to understand potential for being completely eroded?	If yes, Commissions are using the best credible evidence to make an informed decision as to land subject to coastal storm flowage boundaries. *The applicant and Commission should not use MassGIS Q3 data layer for determining the extent of flood zones. In addition, although MassGIS has added a new and more current digital floodplain layer called the NFHL, this layer is not as frequently updated as the NFHL on the FEMA Flood Map Service Center. Therefore, the applicant and Commission should use the NFHL from the Service Center for site specific delineations..*
❑ Have you determined that the elevations on the applicant's plans reference the same datum as used on the FIRM?	The applicant must use one consistent datum so that the BFEs are relative to the same datum as the topographic data and are therefore delineated correctly on the maps. The applicant should convert to NAVD 88, if possible.
For FIRM zone designations (either on the original map or through an approved LOMA/LOMR) that are *consistent* with the flooding history, storms or surges of record, wave activity, and landform changes at the site: ❑ Have the applicant and Commission followed the delineation procedure as described on pages 1-81 through 1-89 for V Zones and A Zones? *And*	**V Zones (not in coastal dune areas)**: Where an A Zone is mapped, the landward V Zone boundary is scaled or overlaid from FIRMs. Where no A Zone is mapped landward of the V Zone, the ground contour that corresponds to the most landward BFE is used to delineate the landward extent of the floodplain. **A Zones**: The ground contour that corresponds to the most landward BFE is used to determine the landward extent of the A Zone. **LiMWA within the A Zones:** The LiMWA boundary on the NFHL is scaled or overlaid onto the contour plan.
❑ Have the applicant and Commission looked for particular indicators in the field, such as: ❑ overwash fans, ❑ evidence of erosion (such as dune scarps), ❑ storm wrack lines, ❑ matted beach grass, and ❑ records/photographs of these indicators from past storm events.	Field indicators can be useful for helping to confirm the extent of flooding and storm damage.

Considerations When Reviewing the Boundaries of Land Subject to Coastal Storm Flowage (continued)	
For FIRM zone designations that are *inconsistent* with the flooding history, storms or surges of record, wave activity, and landform changes at the site: ❑ Are flood elevations higher than depicted on flood maps based on recorded and *credible* evidence from a competent source? *or*	Commissions may use the higher elevation if the data is credible, reliable, and/or based on engineering data.
❑ Are flood elevations lower than depicted on flood maps?	Commission should use a lower elevation *only* if it is based on a LOMR approved by FEMA and *only if it takes into account site-specific information, particularly in dune areas.* If no LOMR has been issued, then a lower elevation should not be used; the applicant and Commission should rely on the original FIRM, provided it meets the other criteria in this checklist.
For Coastal Dune Areas	
Has the applicant determined that: ❑ The FIRM has been accurately updated and revised to reflect the delineation of the primary frontal dune? *and* ❑ The FEMA delineation is consistent with the detailed topography for the site? *and* ❑ The FIRM zone designations are consistent with the flooding history, storms/surges of record, and wave activity? *and* ❑ The site topography has not significantly changed since the primary dune was mapped for the FIRM?	If yes, then the FIRM designations may be used to locate the *minimum extent* of the V Zone. No further analysis is necessary. If no, proceed to the next step.
Absent accurate primary dune designations on FIRMS (*as described above*):	
❑ Has the applicant acknowledged that the proposed project is in the primary dune and in the V Zone?	If yes, there is no need to precisely determine the landward extent of flooding as the project is admittedly within the V Zone.
❑ Is the proposed project allowed under the WPA Regulations, Section 10.28(5)?	If yes, there is no need to precisely determine the landward extent of flooding.
❑ Is there a question whether the proposed project is in the primary dune and within the V Zone? *or* ❑ Is an exact determination of the primary dune boundary warranted?	If yes, the landward toe of primary dune should be delineated according to the methodology described in the coastal dunes section and Appendix C. Proceed to next step to determine extent of V Zone.
❑ Did the delineation of the primary dune depict the proposed project *within* or seaward of the primary dune?	If yes, the inland limit of the primary dune (landward toe of primary dune) will mark the extent of the V Zone. Skip next two steps. If no, proceed to next step.

For Coastal Dune Areas (continued)	
❑ Did the delineation of the primary dune depict the proposed project immediately landward of the primary dune?	If yes, the applicant/Commission will need to determine if the primary dune will be eroded or completely removed in a storm event—so that the most landward extent of V Zone conditions can be accounted for. Proceed to next step. If no (i.e., the proposed project is landward, but not *immediately* landward), Commissions should use their judgment about whether further analysis is warranted to determine if the V Zone extends farther landward (as described next).
❑ Has the Commission reviewed the applicant's calculation of the primary frontal dune reservoir to determine if the dune will be eroded or removed in a storm event? To determine the frontal dune reservoir, refer to Figure 1.18 on page 1-88.	If the frontal dune reservoir is *less than* 1,100 square feet, the dune is subject to complete removal, allowing velocity conditions to extend farther landward. *Wave height analysis and wave runup models may need to be performed to determine how far inland the V Zone will extend.* If the frontal dune reservoir is *greater than* 1,100 square feet, the dune is likely substantial enough to withstand erosion during a base flood event; dune retreat may occur, but velocity conditions and wave action will likely only extend to the inland limit of the primary frontal dune. *The landward toe of primary dune will therefore mark the extent of the V Zone.*
❑ Are field observations consistent with surveys, maps, and other references?	
❑ Other observations:	

- ❑ Other observations: