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Visual Impact Assessment



February | 18 | 2011

DCPC: Visual Impact Assessment Overview



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- **Presentation:**
 - Process we anticipate for establishing visual impact
 - Applicability of what we learn to policy decisions
- **DCPC Guidelines:**
 - Protection of historic districts and historic resources
 - Protection of viewsheds
- **Response = Visual Impact Assessment**
 - Not:
 - a test of whether you can see something
 - whether you are for or against renewable energy
 - whether you find wind turbines beautiful or ugly
 - Is:
 - An **objective** measure of the degree project is compatible with its surroundings on Cape Cod



DCPC: Visual Impact Assessment Process



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- **Impact result of:**
 - Sensitivity of viewpoint
 - Landscape/seascape
 - People who use it
 - Visibility, Dominance and Compatibility of the project
 - Size, location, scale, type, color, density, etc.
- **Team assembled:**
 - multi-disciplinary team
 - Consultant
- **Work to date:**
 - Research (US: Maine, Long Island, USACOE, BLM; Europe: UK)
 - Methodology developed
 - Field work
 - Opinion Poll



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•Public Opinion Poll

- Over summer/fall at coastal locations and public meetings
- Gauge visitor/resident sensitivity to ocean turbines
- Gauge if opinion changed based on the setting
- Establish if there is a distance at which there becomes a significant change in people's opinions about ocean turbines

WIND TURBINE SITING POLL:
Wind Turbine Siting in Cape Cod's Ocean Waters

INSTRUCTIONS:
This poll is a visual impact assessment. It is designed to gauge public opinion on the visual impact of wind turbines in Cape Cod's ocean waters. The poll is divided into four sections, each with a different image. Please answer the questions for each image.

IMAGE A
1. How many wind turbines can you see in the image?
None 1-5 6-10 11-15 16-20 21 or more

2. How do the turbines affect your view?
Very Positive Positive No Effect Negative Very Negative

IMAGE B
3. How many wind turbines can you see in the image?
None 1-5 6-10 11-15 16-20 21 or more

4. How do the turbines affect your view?
Very Positive Positive No Effect Negative Very Negative

IMAGE C
5. How many wind turbines can you see in the image?
None 1-5 6-10 11-15 16-20 21 or more

6. How do the turbines affect your view?
Very Positive Positive No Effect Negative Very Negative

IMAGE D
7. How many wind turbines can you see in the image?
None 1-5 6-10 11-15 16-20 21 or more

8. How do the turbines affect your view?
Very Positive Positive No Effect Negative Very Negative



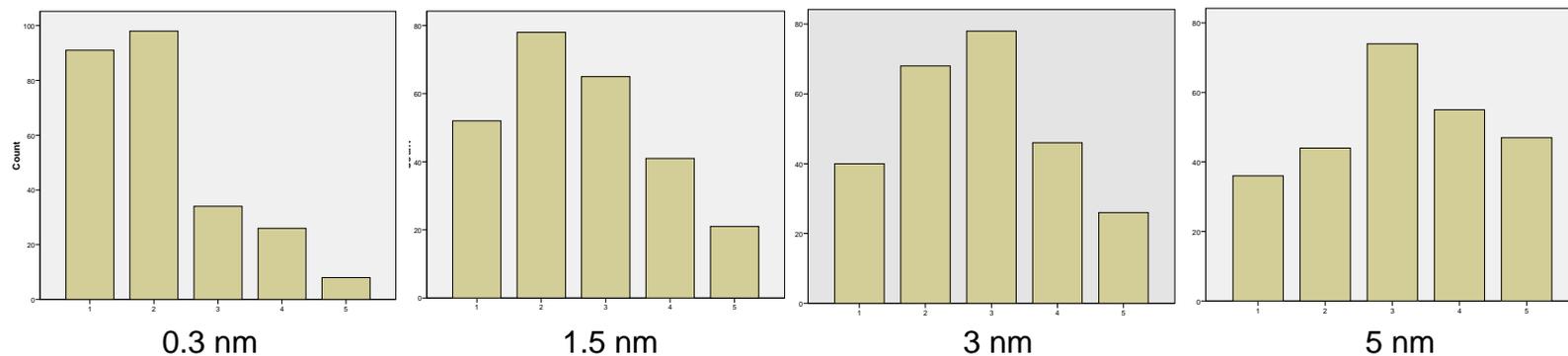
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- **Results**

- No statistically significant difference between residents/visitors opinions
- No statistically significant difference between settings
- Trend toward more positive perception with greater distance



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- **VIA for Cape Cod:**
 1. Seascape Sensitivity: Rank sensitivity of coastal areas
 2. Visibility assessment: Where a project can be seen
 3. Impact assessment: Degree of compatibility



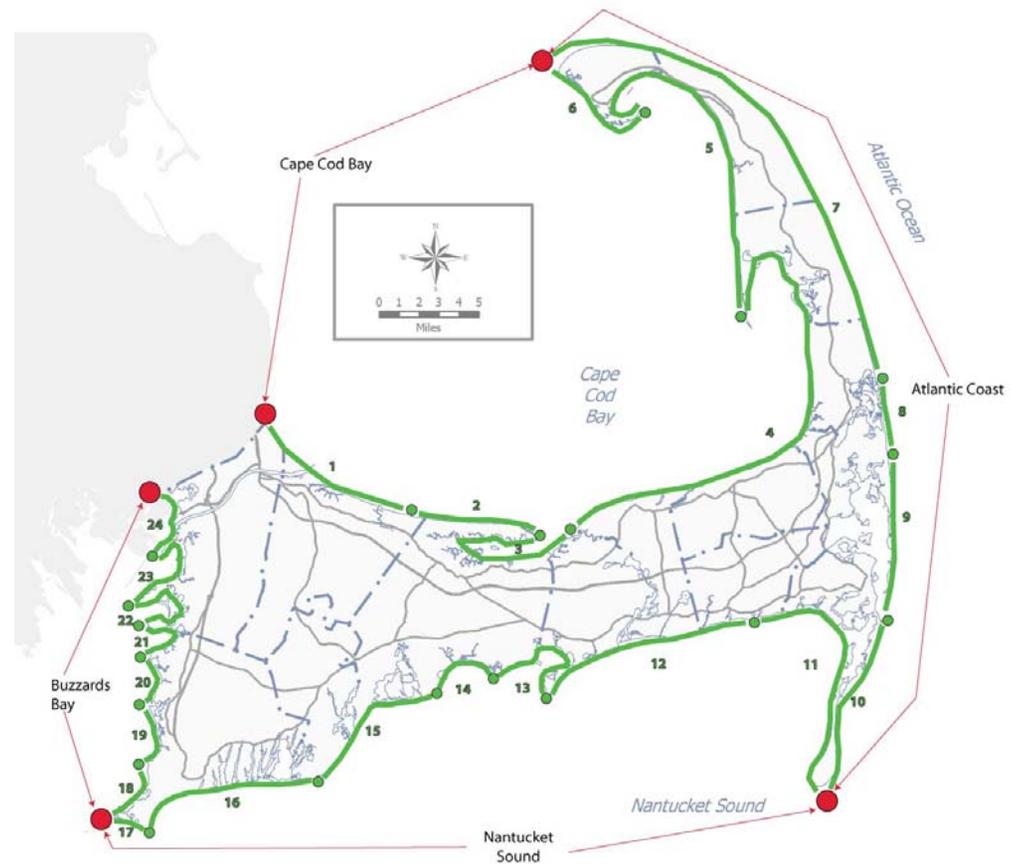
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Seascape sensitivity



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- **Step 1: Establish Seascape Units**
 - Areas grouped based on their characteristics
 - Two types:
 - Regional
 - Local
 - Aim to rank sensitivity of each to change
 - Focused on Cape Cod Bay and Nantucket Sound in short term



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Seascape Sensitivity



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- **Step 2: Classify land area**
- **Grouped based on visual characteristics:**
 - Land use
 - Character
 - Features
 - Transparency
- **Four broad categories:**
 - Wooded
 - Coastal
 - Developed
 - Open

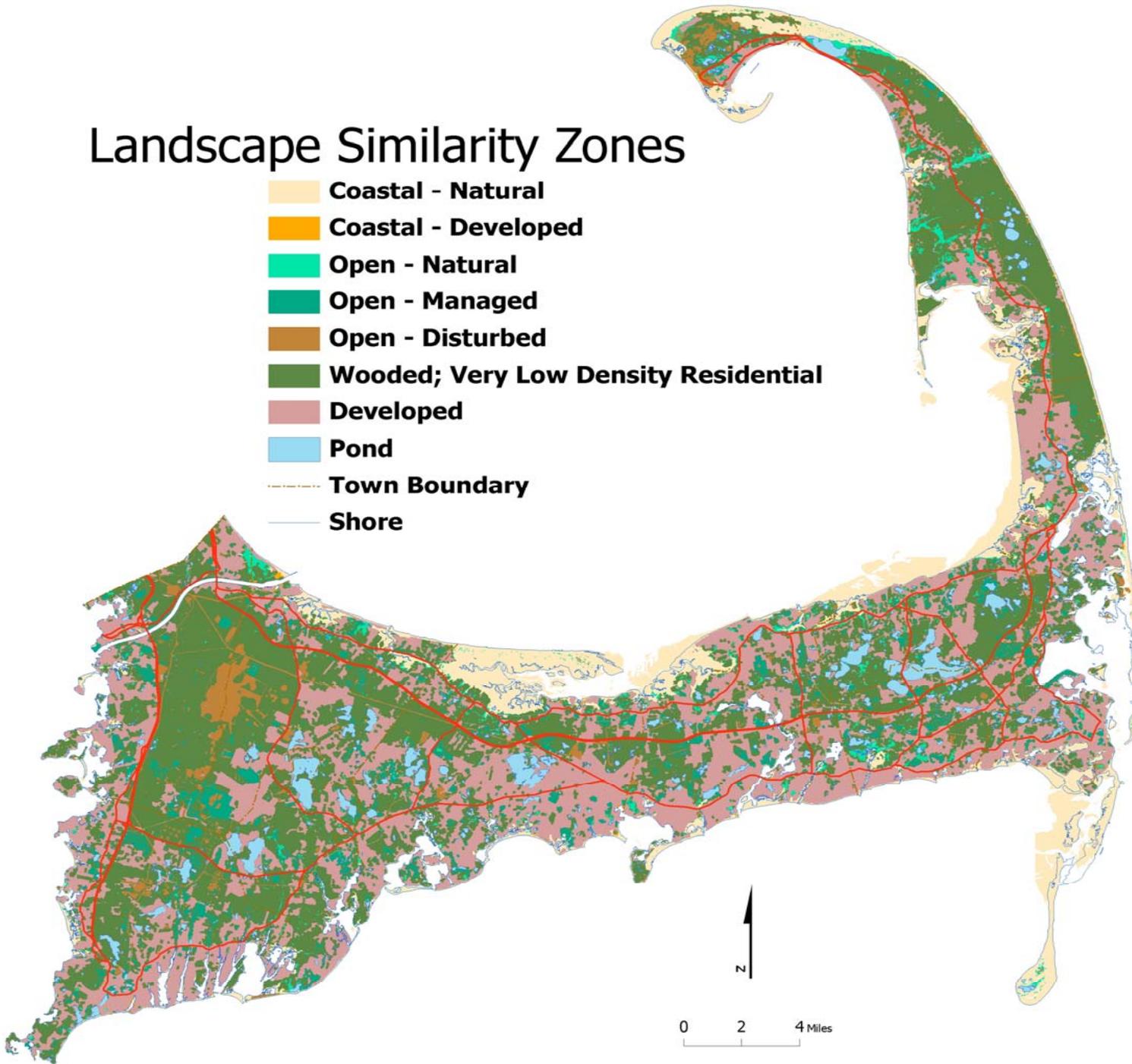


Landscape Similarity Zones

- Coastal - Natural
- Coastal - Developed
- Open - Natural
- Open - Managed
- Open - Disturbed
- Wooded; Very Low Density Residential
- Developed
- Pond
- Town Boundary
- Shore



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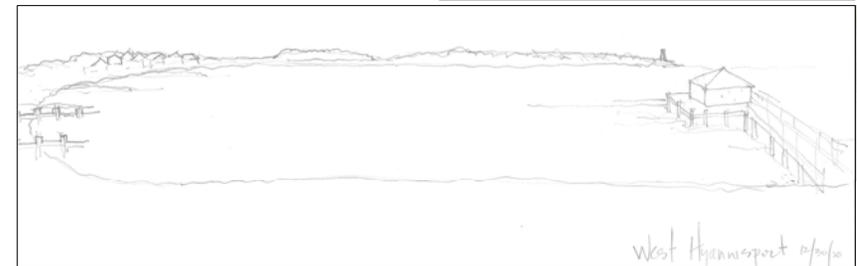
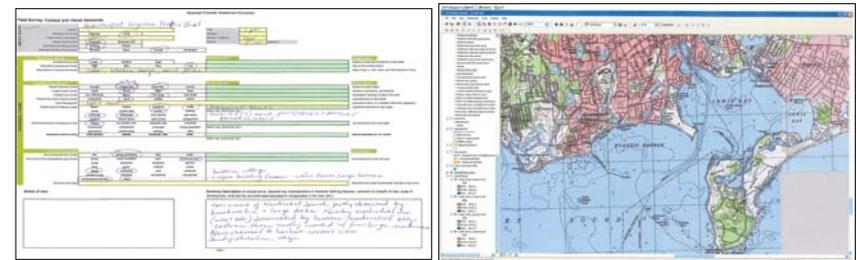


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- **Step 3: Inventory**
 - Staff site visits
 - Photos/sketches and forms used to capture existing setting
- **Recording:**
 1. Visual resources
 2. Users
 3. Quality, Value



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Seascape Sensitivity



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- **Step 3: Inventory**
 1. Visual resources
 - Identify key characteristics
 - Historic resources, cultural landscapes
 - Distinctive natural and scenic lands
 - Shape of landform
 - Sense of enclosure
 - Land cover and land use



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Seascape Sensitivity



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- **Step 3: Inventory**

- 2. Users

- Public beaches, parks
 - Scenic roads, roads with view of the ocean
 - Public recreation areas
 - Ferry routes, boating areas
 - Fishing and shellfishing areas
 - Activities taking place



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- **Step 3: Inventory**

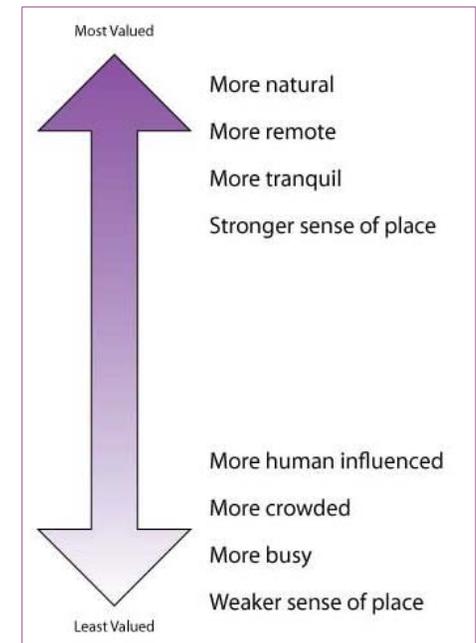
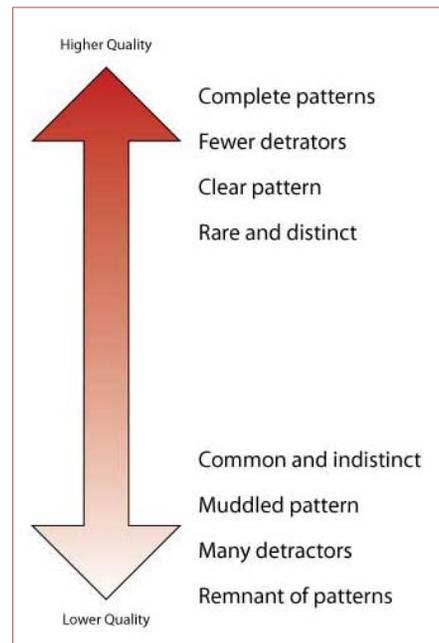
- 3. Quality, Value

- Quality

- Rarity
- Clarity
- Distinctiveness

- Value

- Naturalness
- Sense of place
- Remoteness



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Seascape Sensitivity



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- **Step 4: Ranking sensitivity**
 - Five categories of sensitivity

Classification
Very High
High
Moderate
Low
Very Low

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Seascape Sensitivity



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- **Step 4: Ranking sensitivity**
 - Five categories of sensitivity
- **Scoring system based on:**
 - Landform
 - Focal points or features
 - Settlement pattern
 - Usage
- **Each viewpoint currently being evaluated using these criteria**

SENSITIVITY CRITERIA OR MEASURES	SCORE	SENSITIVITY CLASS				
		Very High	High	Moderate	Low	Very Low
		5	4	3	2	1
SENSITIVITY CRITERIA OR MEASURES	SUB CATEGORY					
LANDFORM	Coastline Shape	Highly complex coastline that significantly limits views to ocean.	Complex coastline that limits views to ocean.	Coastline of moderate complexity.	Simple coastline.	Very simple or straight coastline.
	Enclosure	Highly enclosed viewshed.	Enclosed viewshed.	Moderate enclosure to viewshed.	Minimal enclosure to viewshed.	No enclosure, wide open views.
KEY FOCAL POINTS OR FEATURES	Natural and man-made	Focal points or features in the viewshed that are either natural or man-made and are: Very unusual, unique or very rare, of national or statewide importance/value, or are key character defining features or very distinctive.	Focal points or features in the viewshed that are either natural or man-made and are: Unusual or rare, of regional importance/value, or make a major contribution to the character of the seascape, or are somewhat distinctive.	Focal points or features in the viewshed that are either natural or man-made and are: Somewhat commonly found, of local importance/value, or make a minor contribution to the character of the seascape.	Focal points or features in the viewshed that are either natural or man-made and are: Commonly found, of minimal local importance/value, or contribute little to the character of the seascape, or are indistinct.	Focal points or features in the viewshed that are either natural or man-made and are: Absent or very common, of little or no significance, and do not contribute to the character of the seascape or may detract from it.
	SETTLEMENT FORM/LAND USE PATTERN	Dominant Natural Pattern	Very remote, isolated natural area of national/statewide significance. Man-made structures or features inconspicuous or absent.	Remote, isolated areas of regional significance. Man-made structures and features limited and scattered.	Natural areas of local significance. Man-made structures widespread but not dominant in the view.	Small natural or vegetated areas. Man-made structures dominate view.
	Dominant Man-made Pattern	Clustered development surrounded by more natural areas, such as tightly knit, nationally or state designated historic districts, villages or cultural landscapes. Large-scale infrastructure or structures inconspicuous or absent.	Clustered development of regional significance surrounded by rural, scattered development. Large-scale infrastructure or structures limited and scattered.	Suburban or mostly developed areas, with elements of local importance. Large-scale infrastructure or structures may be visible but not dominant.	Strip commercial developed areas. Large-scale infrastructure or structures may be common and more dominant.	Heavily developed or industrialized/commercialized development pattern. Large-scale infrastructure or structures common and dominant.
USAGE		Very high resident, visitor and/or recreational usage.	High resident, visitor and/or recreational usage.	Moderate resident, visitor and/or recreational usage. Some commercial usage.	Low resident, visitor and/or recreational. Commercial or industrial usage common.	Very low resident, visitor and/or recreational usage. Heavy commercial or industrial use.





		SENSITIVITY CLASS				
		Very High	High	Moderate	Low	Very Low
		5	4	3	2	1
SENSITIVITY CRITERIA OR MEASURES	SCORE					
	SUB CATEGORY					
LANDFORM	Coastline Shape	Highly complex coastline that significantly limits views to ocean.	Complex coastline that limits views to ocean. ✓	Coastline of moderate complexity.	Simple coastline.	Very simple or straight coastline.
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SETTLEMENT FORM/LAND USE PATTERN	Dominant Natural Pattern	Very remote, isolated natural area of national/statewide significance. Man made structures or features inconspicuous or absent.	Remote, natural areas of regional significance. Man-made structures and features limited and scattered. ✓	Natural areas of local significance. Man-made structures widespread but not dominant in the view.	Small natural or vegetated areas. Man-made structures dominate view.	Few or absence of natural areas. Heavily developed areas. Man-made structures very dominant in the view.
	Dominant Man-made Pattern	Clustered development surrounded by more natural areas, such as tightly knit, nationally or state designated historic districts, villages or cultural landscapes. Large-scale infrastructure or structures inconspicuous or absent.	Clustered development of regional significance surrounded by rural, scattered development. Large-scale infrastructure or structures limited and scattered. ✓	Suburban or mostly developed areas, with elements of local importance. Large-scale infrastructure or structures may be visible but not dominant.	Strip commercial developed areas. Large-scale infrastructure or structures may be common and more dominant.	Heavily developed or industrialized/commercialized development pattern. Large-scale infrastructure or structures common and dominant.
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25/30

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Seascape Sensitivity



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- **Classification for each viewpoint based on this analysis**
- **For each seascape unit:**
 - All viewpoints ranked
 - Averaged for the seascape if multiple viewpoints
- **Intended to be an initial evaluation and completed by staff**
- **Will be mapped**

Score	Classification
Range 26-30	Very High
Range 21-25	High
Range 16-20	Moderate
Range 11-15	Low
Range 6-10	Very Low

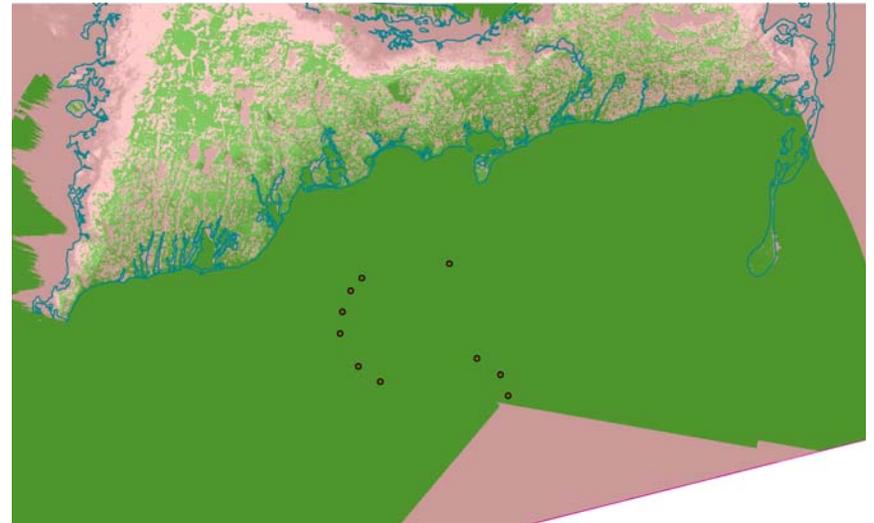


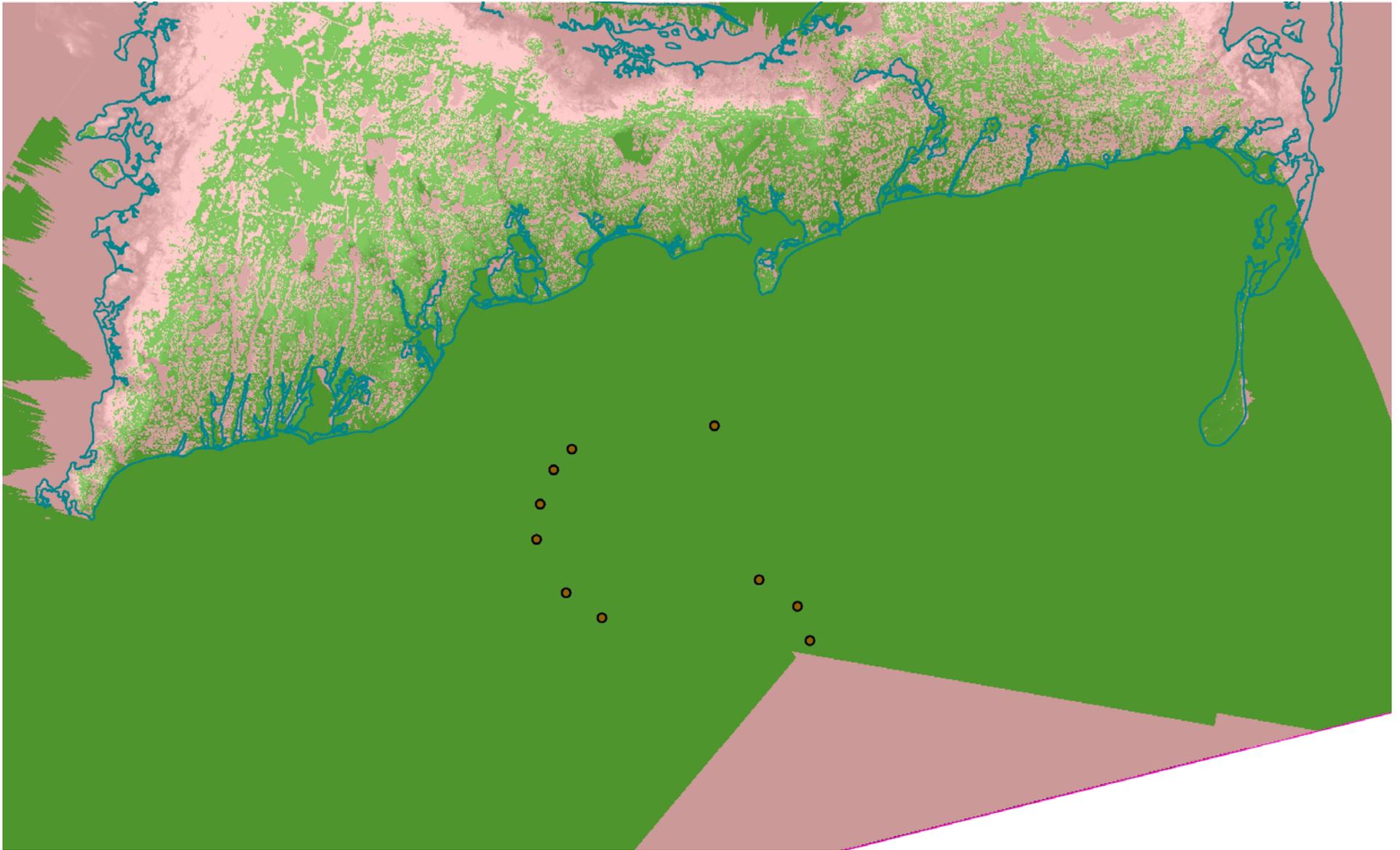
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- Established tool to assist in estimating the points from which project visible
- Tool uses GIS to find Zone of Visual Influence (ZVI – viewshed)
- Maps locations where a project can be **potentially** seen using topography and vegetation



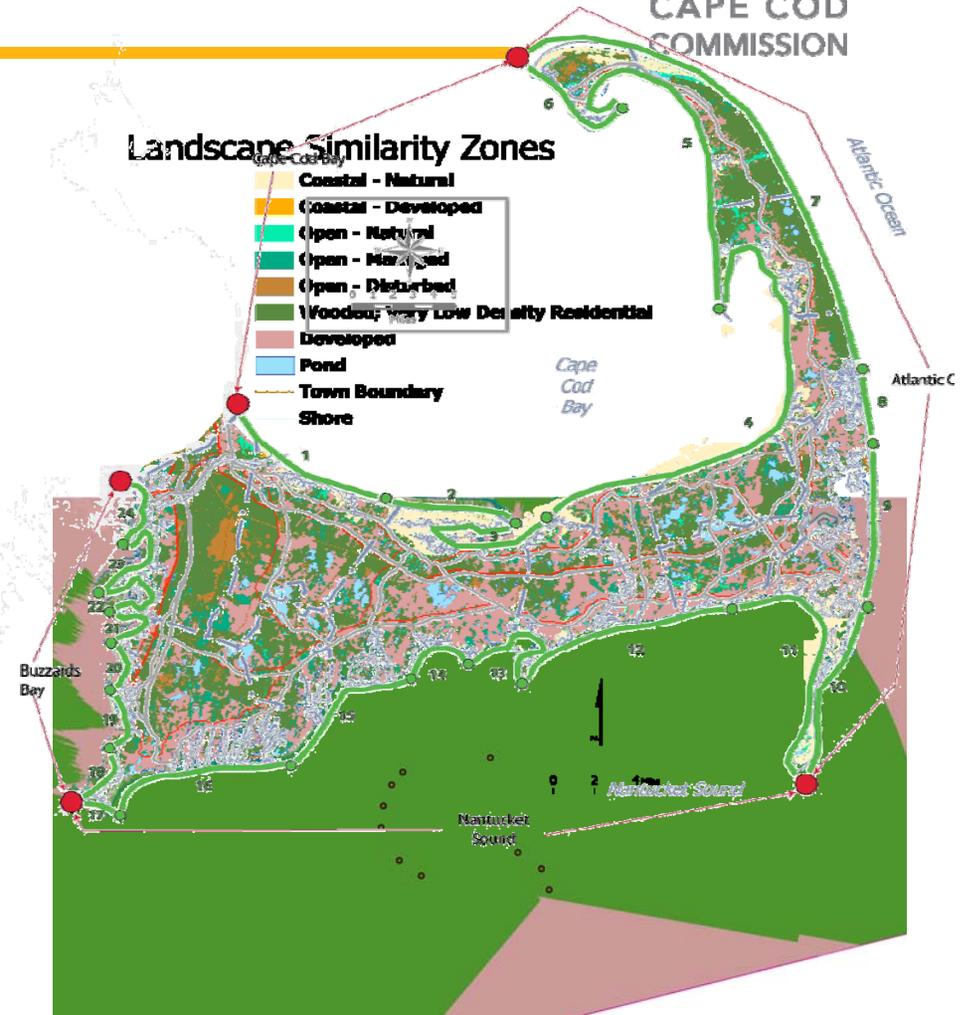


DCPC: Visual Impact Assessment Impact Assessment



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- Overlay:
 - Viewshed mapping
 - landscape sensitivity maps
 - landscape classification
- Identify points for starting assessment process
- Simulations of proposed projects would be completed for points identified



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- Magnitude of the change assessed using a series of indicators
- Ranges from dominant to inconspicuous

Project Indicators of Magnitude of Change

GUIDANCE	INDICATORS OF MAGNITUDE OF CHANGE				
	Very Large	Large	Moderate	Small	Very Small
NAME	Dominant	Prominent	Conspicuous	Apparent	Faint/Inconspicuous
DESCRIPTORS – APPEARANCE IN VIEW	Project prominent or controls the view, either due to its proximity, width, height, number of structures, direction of view, scale, visibility or contrast.	Project stands out or is striking in the view, either due to its proximity, width, height, number of structures, direction of view, scale, visibility or contrast.	Project is clearly visible and noticeable within the view, either due to its proximity, width, height, number of structures, direction of view, scale, visibility or contrast.	Project visible or evident within the view, either due to its proximity, width, height, number of structures, direction of view, scale, visibility or contrast.	Project indistinct or not obvious within the view, either due to its proximity, width, height, number of structures, direction of view, scale, visibility or contrast.
DEFINITION	Project causes a very large alteration to the seascape character, or features within the seascape, such that there is a fundamental change from the pre-existing condition.	Project causes a large alteration to the seascape character, or features within the seascape, such that there is a noticeable change from the pre-existing condition.	Project causes a moderate alteration to the seascape character, or features within the seascape, such that there is a discernible change from the pre-existing condition.	Project causes a small alteration to the seascape character, or features within the seascape, such that there is a perceptible change from the pre-existing condition.	Project causes a very small alteration to the seascape character, or features within the seascape, such that there is a discernible change from the pre-existing condition.
EXAMPLES	<ul style="list-style-type: none"> • Major changes that introduce a new and dominant and highly intrusive element into the seascape. • Changes in views from very important viewpoints or districts, such as national or state, cultural or historic landscapes. • Changes that occur at the major focus points of view, where the focus is of national or state significance. • Changes affecting very large numbers of people. • Changes where very large proportions of the horizon are occupied by development. • Changes that occur at very short distances from the viewpoint. • Changes that are highly contrasting in terms of scale, color, form, line and texture. • Changes that are viewed for extended periods from scenic roads, scenic viewpoints or US/state numbered highways. • Changes that affect very long stretches of the coastline, and/or many communities and/or a considerable part of the land and sea area of the region. 	<ul style="list-style-type: none"> • Large changes that introduce a new and dominant and intrusive element into the seascape. • Changes in views from important regional viewpoints, routes or districts, such as cultural or historic landscapes. • Changes that occur at the focus points of key or character defining views, where the focus is of regional significance. • Changes affecting large numbers of people. • Changes where large proportions of the horizon are occupied by development. • Changes that occur at short distances from the viewpoint. • Changes that are contrasting in terms of scale, color, form, line and texture. • Changes that are viewed in glimpses from scenic roads, scenic viewpoints or US/state numbered highways. • Changes that affect long stretches of the coastline, and/or several communities and/or a major part of the land and sea area of the region. 	<ul style="list-style-type: none"> • Changes that introduce a new and noticeable and distinct element into the seascape. • Changes in views from important local viewpoints, routes or districts, such as cultural or historic landscapes. • Changes that occur at the focus points of key or character defining views, where the focus is of local significance. • Changes affecting moderate numbers of people. • Changes where moderate proportions of the horizon are occupied by development. • Changes that occur at moderate distances from the viewpoint. • Changes that are moderately contrasting in terms of scale, color, form, line and texture. • Changes that are viewed for extended periods from regional viewpoints. • Changes that affect stretches of the coastline, and/or multiple communities and/or a moderate part of the land and sea area of the region. 	<ul style="list-style-type: none"> • Small changes that involve features already present in seascape. • Small changes that affect less important viewpoints, routes or districts. • Changes that occur well away, or outside of, the focus points of view. • Changes affecting relatively small numbers of people. • Changes affecting areas that are working in industrialized seascapes. • Changes where small proportions of the horizon are occupied by development. • Changes that occur at long distances from the viewpoint. • Changes that are not contrasting in terms of scale, color, form, line and texture. • Changes that are glimpsed from regional viewpoints or viewed for extensive periods from local roads. • Changes that affect small stretches of the coastline, and/or a limited number of communities and/or a minor part of the land and sea area of the region. 	<ul style="list-style-type: none"> • Very small changes that involve features already present in seascape. • Small changes that affect less important viewpoints, routes or districts. • Small changes that occur well away, or far outside, the focus points of view. • Changes affecting relatively small numbers of people. • Changes affecting areas that are working in industrialized seascapes. • Changes where very small proportions of the horizon are occupied by development. • Changes that occur at very long distances from the viewpoint. • Changes that are not contrasting in terms of scale, color, form, line and texture. • Changes that are glimpsed from local or private roads. • Changes that affect very small stretches of the coastline, and/or a small part of the land and sea area of the region.

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Impact Assessment



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- Impact is a combination of the sensitivity of the seascape and the change resulting from the project
- Requirements are based on a continuum, from a rigorous VIA to a simplified VIA
- Design strategies and mitigation can be applied to minimize potential impact

Potential Visual Impact

		Magnitude of change				
		Very Large	Large	Moderate	Small	Very Small
Seascape or viewpoint Sensitivity	Very High (score from 26-30)	High potential impact	High potential impact	High potential impact	High potential impact	Moderate potential impact
	High (score from 21-25)	High potential impact	High potential impact	Moderate potential impact	Moderate potential impact	Low potential impact
	Moderate (score from 16-20)	High potential impact	Moderate potential impact	Moderate potential impact	Low potential impact	Low potential impact
	Low (score from 11-15)	High potential impact	Moderate potential impact	Moderate potential impact	Low potential impact	Low potential impact
	Very Low (Score from 6-10)	Moderate potential impact	Moderate potential impact	Low potential impact	Low potential impact	Low potential impact

Legend:
■ High potential impact ■ Moderate potential impact ■ Low potential impact

<p>Rigorous Visual Assessment required:</p> <ul style="list-style-type: none"> • Greater number of viewpoints • Greater number of simulations • Greater analysis of landscape character and inventory 		<p>Streamlined Visual Assessment required:</p> <ul style="list-style-type: none"> • Smaller number of viewpoints • Smaller number of simulations • Less analysis of landscape character and inventory
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Initial findings



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- Degree of impact determined primarily by:
 - Location and distance
 - project configuration
- Opinion poll showed preference for placing further from shore
- Using our scale:
 - very few seascapes, if any, of very low sensitivity
 - Few that are very highly sensitive