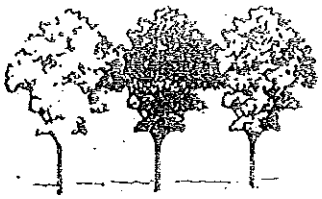


PLANNING COMMISSION EXHIBIT #162

Connecticut Fund for the Environment

To: Old Saybrook Planning Commission

From: Connecticut Fund for the Environment

Date: January 10, 2005

Re: River Sound Development, LLC application – CFE Intervention Petition

Attached, you will find several GIS maps that illustrate the natural resource impacts of several different development layouts on the property known as "the Preserve." To determine the relative scale of the ecological impacts of the differing proposals, the site in its undeveloped natural state was assigned a relative ecological inventory score of 100%. The ecological impact of various development designs was then evaluated with respect to three natural resource criteria drawn from Old Saybrook's Open Space Regulations and Connecticut statutes: Forest and Habitat Fragmentation, Water Resources, and Vernal Pools and Vernal Pool Habitat. Each proposal is scored for one or more of these natural resource values. The higher the resulting score, the better the proposal from an environmental perspective.

As is evident from the attached materials the applicant's development proposal will have a far greater negative impact on these natural resources than the alternative design proposed by the intervening party, Connecticut Fund for the Environment. This alternative was designed with two key concepts, beyond reducing natural resource impacts, in mind.[1] First, we used the applicant's own numbers regarding the number of units to be sited on the property (roughly 250). While we agree with the town of Old Saybrook's consultants that the number of units proposed by the applicant is unrealistically high, we wanted to demonstrate that even in the worst case scenario, i.e. using the applicant's proposed numbers, a prudent and feasible alternative that is more ecologically sensitive responsible exists. Second, we designed the alternative bearing in

[1] In designing the alternative, we also had input from George Logan of Rema Ecological Services.

mind the town's requirements for multiple roadway access points and cul-de-sac limitations.

We anticipate that the applicant will complain about the removal of the golf course from the proposed alternative design. Specifically, we have heard several times during the course of these proceedings that the applicant believes that removing the golf course component would diminish its return on the project. The Commission should be aware, however, that neither your own zoning regulations nor the state Environmental Protection Act are designed to guarantee an applicant the greatest possible economic yield. Indeed, at its most fundamental level, zoning law recognizes that economic maximization is inconsistent with responsible development and planning. Every regulation necessarily limits the scope of what an applicant might otherwise choose to do if guided solely by self-interest and profit maximization. It may be that the applicant has made a bad investment decision; it is certainly not the obligation of this Commission to protect the applicant from the effects of its own folly.

In sum, these materials demonstrate that the application before you is reasonably likely to unreasonably pollute, impair or destroy the public trust in the natural resources of the state and that there is a prudent and feasible alternative consistent with the reasonable requirements of the public health, safety and welfare.[2]

[2] For further information, I refer you to the letter of Carolyn Longstreth, dated January 5, 2005, and the reports submitted by, inter alia, George Logan of Rema Ecological Services.

Unfragmented Forest

How valuable is the forest remaining after development?
(The area of the forest weighted by how remote it is from human activity (roads, homes, etc.))

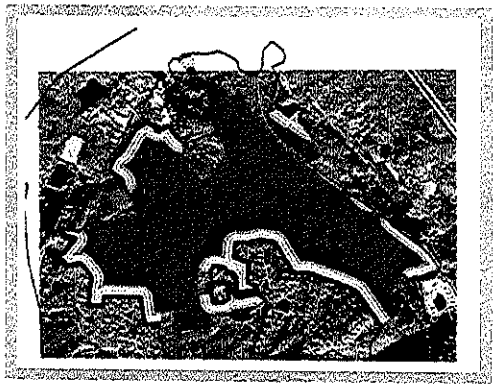
More Ecological Integrity
Less Environmental Impact

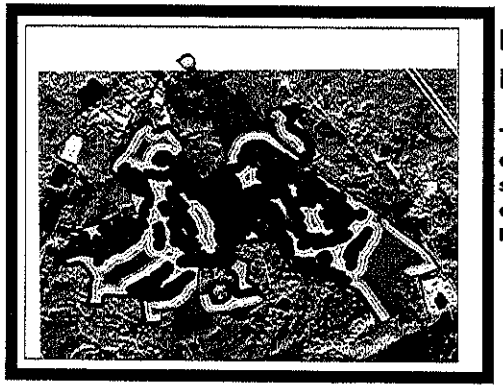
Less Ecological Integrity
More Environmental Impact

Existing Site

Preserving the existing site would retain significant unfragmented forest areas

100%





Proposed Development

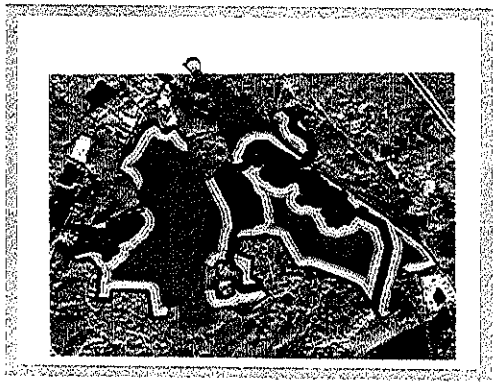
The proposed development would significantly fragment the existing forest and habitats

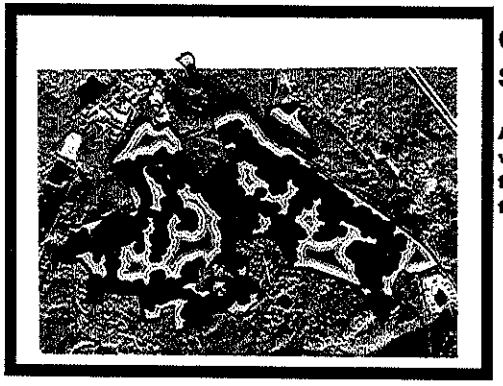
42%

Alternative Development

Eliminating the golf course and reconfiguring the developed areas would result in a forest that is less fragmented

66%





Conventional Subdivision

A conventional subdivision would also significantly fragment the existing forest and habitats

33%

Water Resources

How well are the wetlands, watercourses, and associated buffer areas being avoided?

(The area of the wetland, watercourse, or buffer area weighted by how close it is to the water resource)

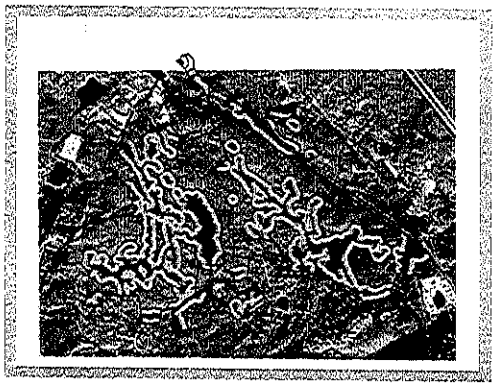
More Ecological Integrity
Less Environmental Impact

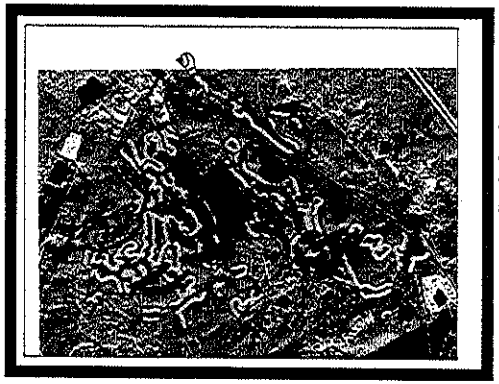
Less Ecological Integrity
More Environmental Impact

Existing Site

Preserving the existing site would preserve significant wetlands, watercourses, and buffer areas

100%





Proposed Development

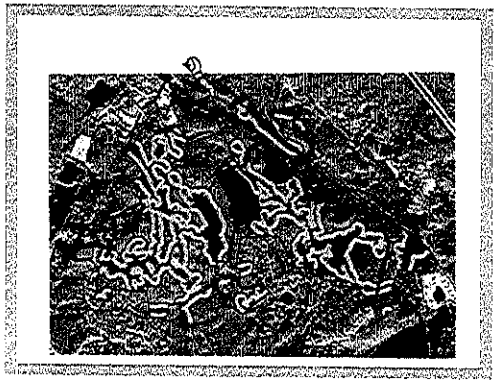
The proposed development would affect wetlands, watercourses and buffer areas

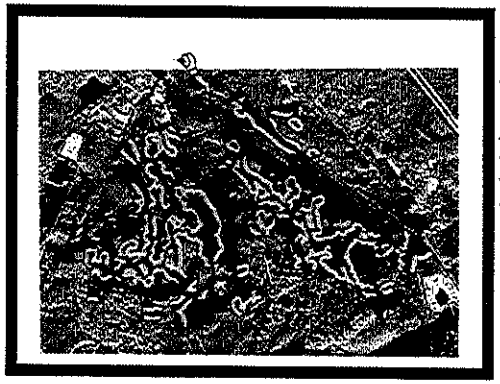
83%

Alternative Development

Eliminating the golf course and reconfiguring the developed areas would result in less impacts on water resources

97%





Conventional Subdivision

A conventional subdivision (with no golf course) would have less impact on the water resources

90%

Vernal Pool Habitats

How well are the vernal pools and associated upland habitat areas being avoided?

(The area of the vernal pool or upland habitat area weighted by how close it is to the vernal pool)

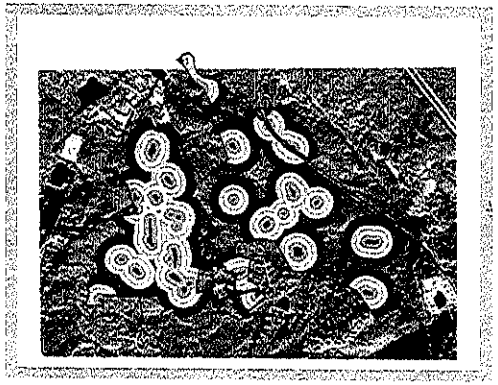
More Ecological Integrity
Less Environmental Impact

Less Ecological Integrity
More Environmental Impact

Existing Site

Preserving the existing site would retain significant vernal pools and associated upland habitats

100%



Proposed Development

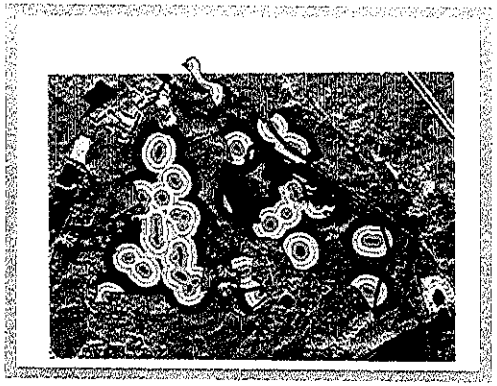
The proposed development would affect existing vernal pools and associated upland habitat areas

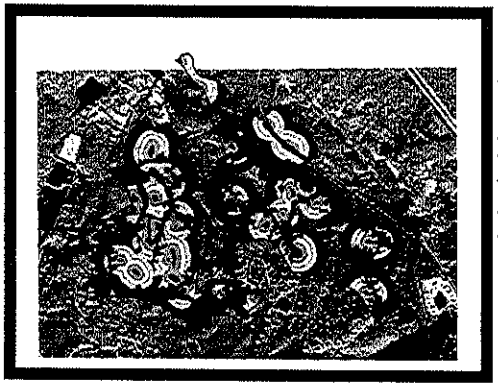
76%

Alternative Development

Eliminating the golf course and reconfiguring the developed areas would result in less impacts on vernal pools and habitat areas

92%





Conventional Subdivision

A conventional subdivision would also affect existing vernal pools and associated upland habitat areas

70%

Undisturbed Area

How much of the parcel is undisturbed by development?

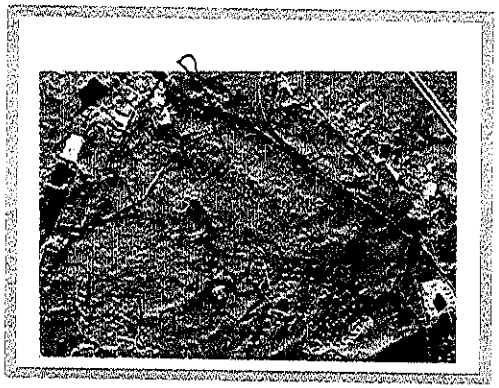
More Ecological Integrity
Less Environmental Impact

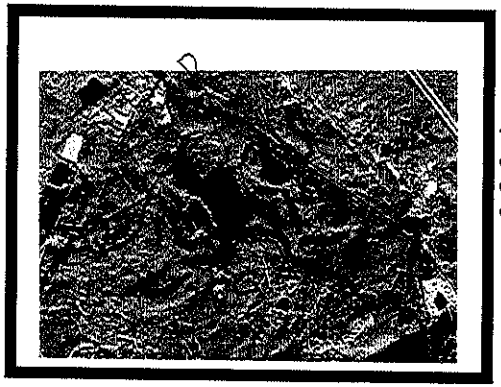
Less Ecological Integrity
More Environmental Impact

Existing Site

Preserving the existing site would retain significant undisturbed areas

100%





Proposed Development

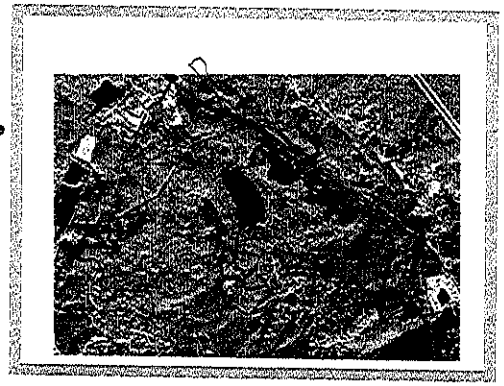
The proposed development would disturb approximately 27% of the site

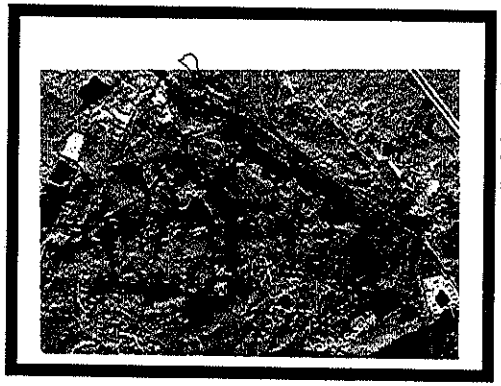
73%

Alternative Development

Eliminating the golf course and reconfiguring the developed areas would result in less disturbance of the site

87%





Conventional Subdivision

A conventional subdivision would disturb 33% of the site

67%

EXISTING SITE CONDITIONS

Water Resources	**Scored 0 to 5**
Vernal Pool Habitats	**Scored 0 to 5**

These two resources are laid over each other and "score" summed to provide a consolidated score on a 10 point scale

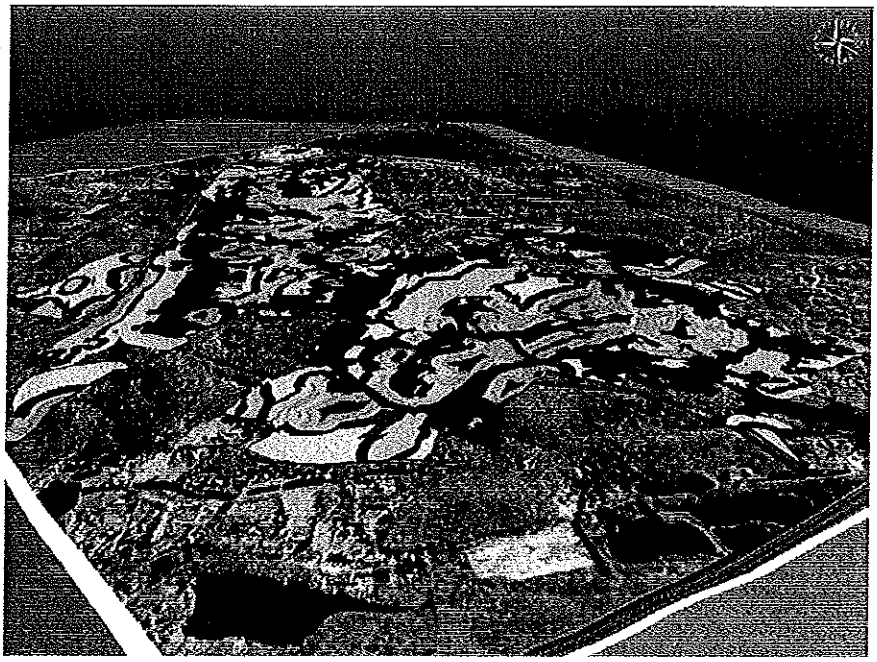
The legend is as follows

1 and 2	**light blue**
3 and 4	**darker blue**
5 and 6	**lightest green**
7 and 8	**medium green**
9 and 10	**darkest green**

Darkest green areas are highest score

Proposed Development relative to resource scores

Conventional Subdivision Development relative to resource scores

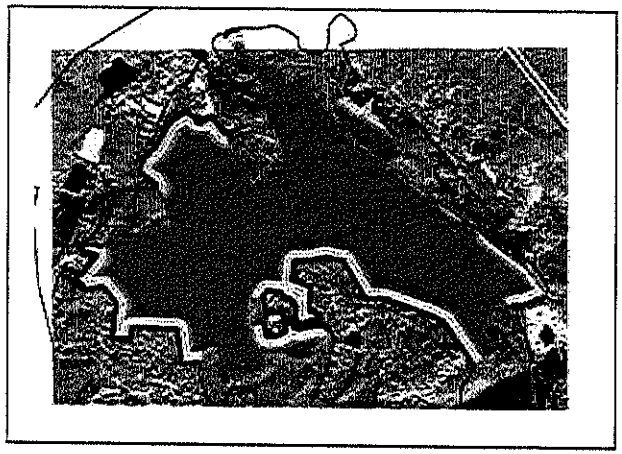


Proposed Development (without golf) relative to resource scores

Alternative Development (without golf) relative to resource scores

Unfragmented Forest

Measures how much of the parcel remains as forest and weights it by how remote the forest areas are from human activity (roads, homes, etc.)

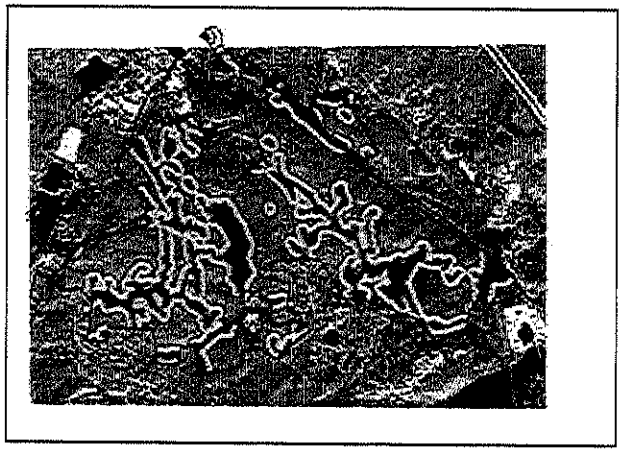


Value	Description	Area Measured	Weighted Score
5	Forest areas 400 + feet from human activity	754	3,770
4	Forest areas 300 - 400 feet from human activity	56	224
3	Forest areas 200 to 300 feet from human activity	57	171
2	Forest areas 100 to 200 feet from human activity	57	114
1	Forest areas 0 to 100 feet from human activity	59	59
0	Developed area	0	0
		983	4,338

$$\frac{\text{Score}}{\text{Base Case}} = \frac{4{,}338}{4{,}338} = 100\%$$

Water Resources

Measures how much of the wetlands, watercourses, and buffer areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the water resource

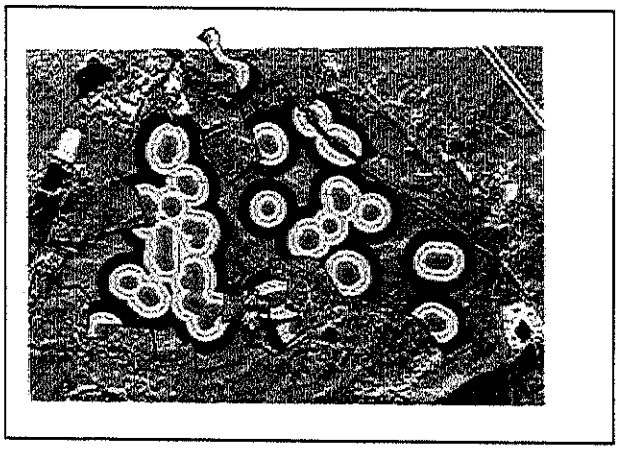


Value	Description	Area Measured	Weighted Score
5	Undeveloped wetland or watercourse	121	605
4	Undeveloped land within 0 to 50 feet of a wetland or watercourse	124	496
3	Undeveloped land within 50 to 100 feet of a wetland or watercourse	117	351
2	Undeveloped land within 100 to 150 feet of a wetland or watercourse	107	214
1	Undeveloped land within 150 to 200 feet of a wetland or watercourse	93	93
0	Developed land within 200 feet of a wetland or watercourse or areas located 200 + feet from wetland / watercourse	421	0
		983	1,759

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}759}{1{,}759} = 100\%$$

Vernal Pool Habitat

Measures how much of the vernal pools and surrounding habitat areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the vernal pool

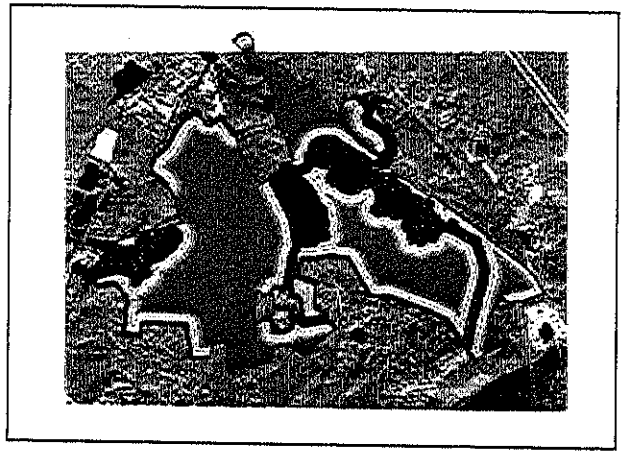


Value	Description	Area Measured	Weighted Score
5	Vernal pool	15	75
4	Undeveloped land within 0 to 150 feet from a vernal pool	103	412
3	Undeveloped land within 150 to 300 feet from a vernal pool	158	474
2	Undeveloped land within 300 to 450 feet from a vernal pool	168	336
1	Undeveloped land within 450 to 750 feet from a vernal pool	160	160
0	Developed land within 750 feet of a vernal pool or areas located 200 + feet from a vernal pool	379	0
		983	1,457

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}572}{1{,}572} = 100\%$$

Unfragmented Forest

Measures how much of the parcel remains as forest and weights it by how remote the forest areas are from human activity (roads, homes, etc.)



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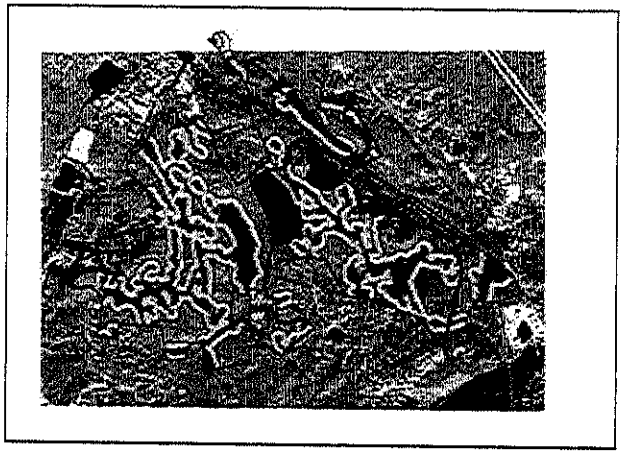
Value	Description	Area Measured	Weighted Score
5	Forest areas 400 + feet from human activity	409	2,045
4	Forest areas 300 - 400 feet from human activity	79	316
3	Forest areas 200 to 300 feet from human activity	94	282
2	Forest areas 100 to 200 feet from human activity	116	232
1	Forest areas 0 to 100 feet from human activity	163	163
0	Developed area	122	2,876
		983	

$$\frac{\text{Score}}{\text{Base Case}} = \frac{2{,}876}{4{,}338} = 66\%$$

Water Resources

Measures how much of the wetlands, watercourses, and buffer areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the water resource



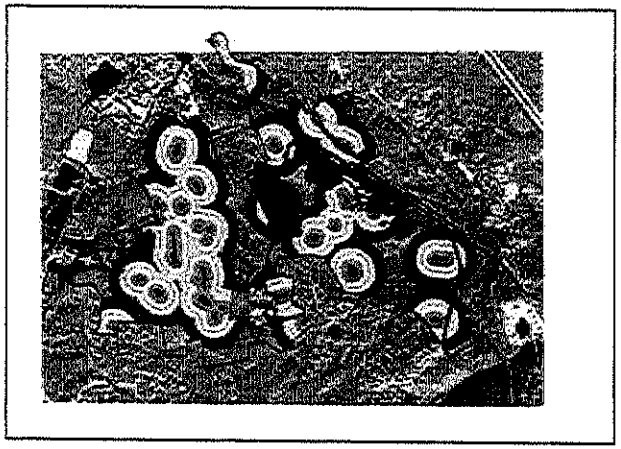
Value	Description	Area Measured	Weighted Score
5	Undeveloped wetland or watercourse	120	600
4	Undeveloped land within 0 to 50 feet of a wetland or watercourse	122	488
3	Undeveloped land within 50 to 100 feet of a wetland or watercourse	112	336
2	Undeveloped land within 100 to 150 feet of a wetland or watercourse	99	198
1	Undeveloped land within 150 to 200 feet of a wetland or watercourse	83	83
0	Developed land within 200 feet of a wetland or watercourse or areas located 200 + feet from wetland / watercourse	447	0
		983	1,705

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}705}{1{,}759} = 97\%$$

Base Case: 620

Vernal Pool Habitat

Measures how much of the vernal pools and surrounding habitat areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the vernal pool

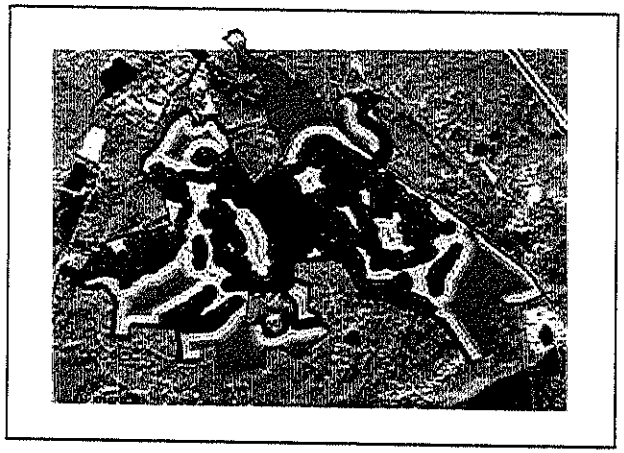


Value	Description	Area Measured	Weighted Score
5	Vernal pool	15	75
4	Undeveloped land within 0 to 150 feet from a vernal pool	98	392
3	Undeveloped land within 150 to 300 feet from a vernal pool	145	435
2	Undeveloped land within 300 to 450 feet from a vernal pool	146	292
1	Undeveloped land within 450 to 750 feet from a vernal pool	253	253
0	Developed land within 750 feet of a vernal pool or areas located 200 + feet from a vernal pool	326	0
		983	1,447

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}447}{1{,}572} = 92\%$$

Unfragmented Forest

Measures how much of the parcel remains as forest and weights it by how remote the forest areas are from human activity (roads, homes, etc.)



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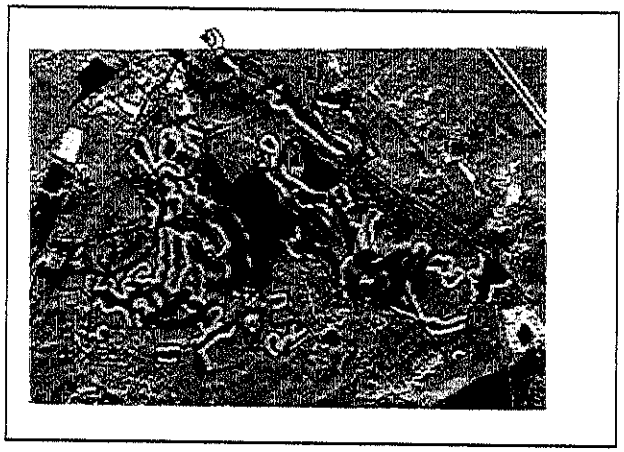
Value	Description	Area Measured	Weighted Score
5	Forest areas 400 + feet from human activity	151	755
4	Forest areas 300 - 400 feet from human activity	56	224
3	Forest areas 200 to 300 feet from human activity	88	264
2	Forest areas 100 to 200 feet from human activity	152	304
1	Forest areas 0 to 100 feet from human activity	271	271
0	Developed area	265	0
		983	1818

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}818}{4{,}338} = \boxed{42\%}$$

Water Resources

Measures how much of the wetlands, watercourses, and buffer areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the water resource



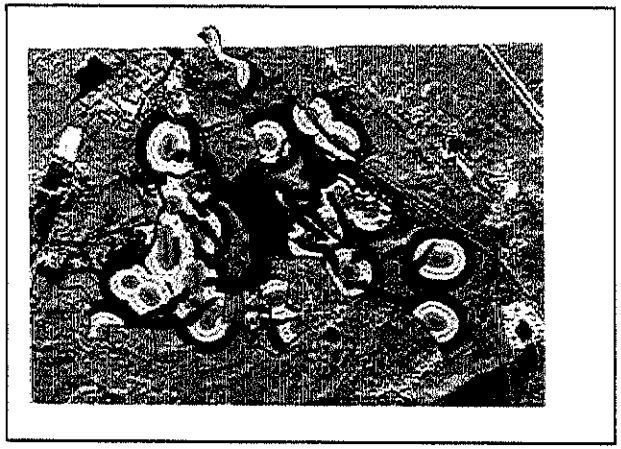
Value	Description	Area Measured	Weighted Score
5	Undeveloped wetland or watercourse	114	570
4	Undeveloped land within 0 to 50 feet of a wetland or watercourse	103	412
3	Undeveloped land within 50 to 100 feet of a wetland or watercourse	88	264
2	Undeveloped land within 100 to 150 feet of a wetland or watercourse	74	148
1	Undeveloped land within 150 to 200 feet of a wetland or watercourse	63	63
0	Developed land within 200 feet of a wetland or watercourse or areas located 200 + feet from wetland / watercourse	541	0
		983	1,457

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}457}{1{,}759} = \boxed{83\%}$$

$$\frac{\text{Base Case}}{620}$$

Vernal Pool Habitat

Measures how much of the vernal pools and surrounding habitat areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the vernal pool

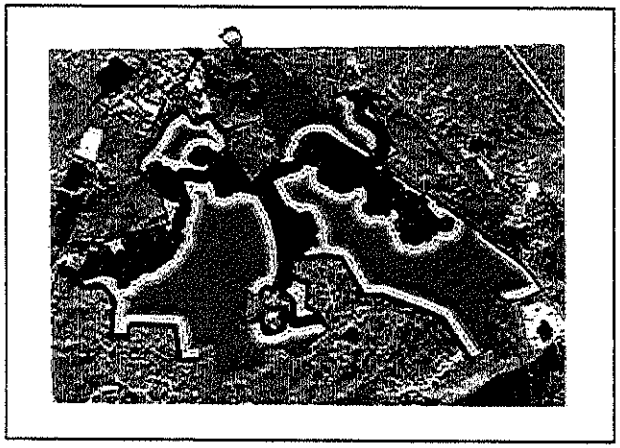


Value	Description	Area Measured	Weighted Score
5	Vernal pool	15	75
4	Undeveloped land within 0 to 150 feet from a vernal pool	87	348
3	Undeveloped land within 150 to 300 feet from a vernal pool	114	342
2	Undeveloped land within 300 to 450 feet from a vernal pool	121	242
1	Undeveloped land within 450 to 750 feet from a vernal pool	207	207
0	Developed land within 750 feet of a vernal pool or areas located 200 + feet from a vernal pool	439	0
		983	1,214

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}214}{1{,}572} = 77\%$$

Unfragmented Forest

Measures how much of the parcel remains as forest and weights it by how remote the forest areas are from human activity (roads, homes, etc.)



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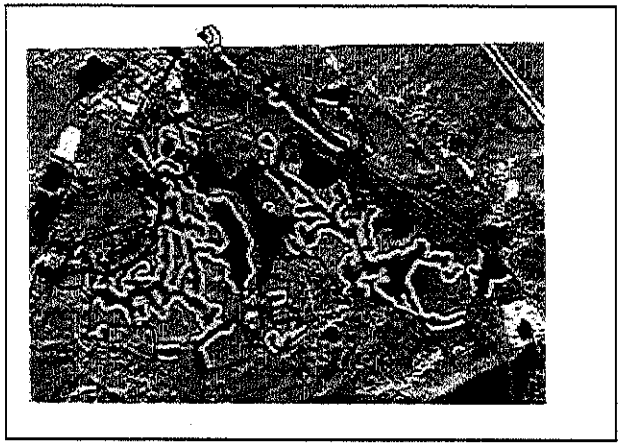
Value	Description	Area Measured	Weighted Score
5	Forest areas 400 + feet from human activity	368	1,840
4	Forest areas 300 - 400 feet from human activity	83	332
3	Forest areas 200 to 300 feet from human activity	96	288
2	Forest areas 100 to 200 feet from human activity	119	238
1	Forest areas 0 to 100 feet from human activity	181	181
0	Developed area	136	0
		983	2,879

$$\frac{\text{Score}}{\text{Base Case}} = \frac{2{,}879}{4{,}338} = 66\%$$

Water Resources

Measures how much of the wetlands, watercourses, and buffer areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the water resource

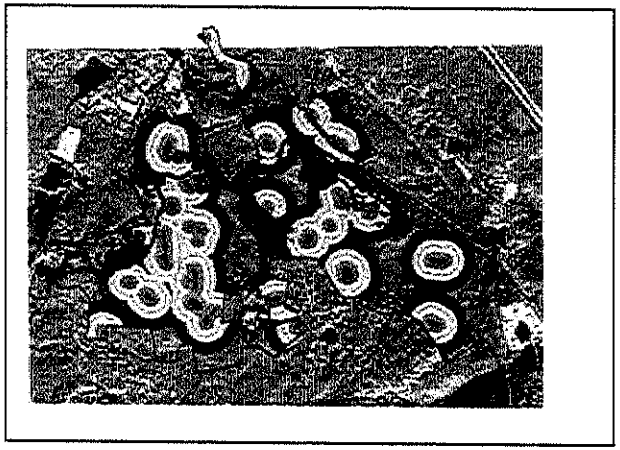


Value	Description	Area Measured	Weighted Score
5	Undeveloped wetland or watercourse	121	605
4	Undeveloped land within 0 to 50 feet of a wetland or watercourse	122	488
3	Undeveloped land within 50 to 100 feet of a wetland or watercourse	112	336
2	Undeveloped land within 100 to 150 feet of a wetland or watercourse	98	196
1	Undeveloped land within 150 to 200 feet of a wetland or watercourse	83	83
0	Developed land within 200 feet of a wetland or watercourse or areas located 200 + feet from wetland / watercourse	447	0
		983	1,708

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}708}{1{,}759} = 97\%$$

Vernal Pool Habitat

Measures how much of the vernal pools and surrounding habitat areas are not impacted by development (homes, roads, lawns, cleared areas) and weights it by proximity to the vernal pool



Value	Description	Area Measured	Weighted Score
5	Vernal pool	15	75
4	Undeveloped land within 0 to 150 feet from a vernal pool	100	400
3	Undeveloped land within 150 to 300 feet from a vernal pool	144	432
2	Undeveloped land within 300 to 450 feet from a vernal pool	144	288
1	Undeveloped land within 450 to 750 feet from a vernal pool	248	248
0	Developed land within 750 feet of a vernal pool or areas located 200 + feet from a vernal pool	332	0
		983	1,443

$$\frac{\text{Score}}{\text{Base Case}} = \frac{1{,}443}{1{,}572} = 92\%$$

The Preserve

PUBLIC HEARING

January 12, 2005

Overview

- An Open Space Subdivision must conserve natural resources
- The site is ecologically unique
- The applicant's proposal would damage the ecology of the site and diminish its natural diversity
- A feasible, prudent and ecologically-sensitive alternative exists

Measuring Impacts to Natural Diversity at the Landscape Level

George T. Logan, MS, PWS, CE
Rema Ecological Services, LLC

Landscape Ecology

- Is the study of how landscape structure affects the abundance and distribution of organisms. It looks at:
  - "Composition" (e.g. habitat types and size, length of forest edge, density of houses and roads)
  - "Configuration" (e.g. juxtoposition of habitat types, measures of habitat fragmentation)

Habitat Fragmentation

- "Habitat fragmentation is the most serious threat to biological diversity and is the primary cause of the present extinction crisis'." (Wilcox and Murphy 1985)

- Biological Diversity or Biodiversity includes genetic diversity, species diversity and ecological diversity.

Forest Fragmentation

- Is responsible in our region for adverse changes in *natural diversity* and for declines and local extinctions of
  - Birds vulnerable to nest predation and parasitism
  - Small forest wildlife and invertebrates (e.g. moths and butterflies with poor dispersal abilities)
  - Uncommon forest understory plants

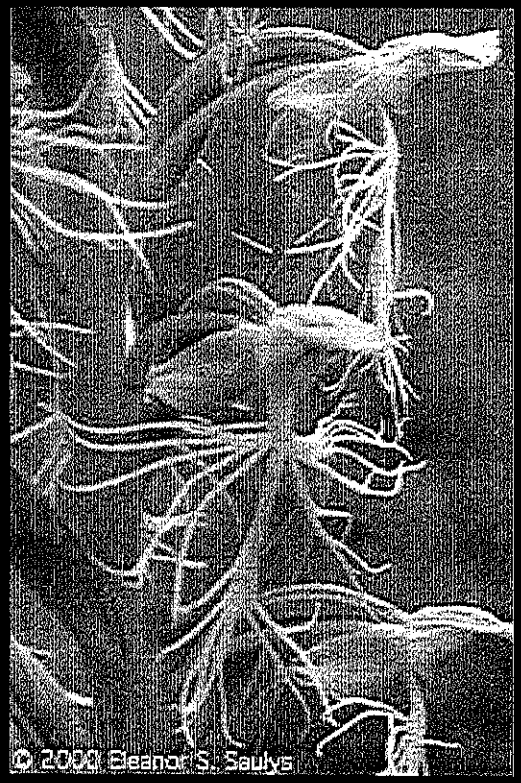
Landscape-scale Metrics

- Metrics can be used to evaluate and compare impacts to *natural diversity* using Geographic Informations Systems (GIS):

  - Unfragmented, Undisturbed Habitat remaining
  - Water Resource Impacts
  - Natural Diversity or "Listed Species" Impacts
  - Vernal Pool Habitat Impacts

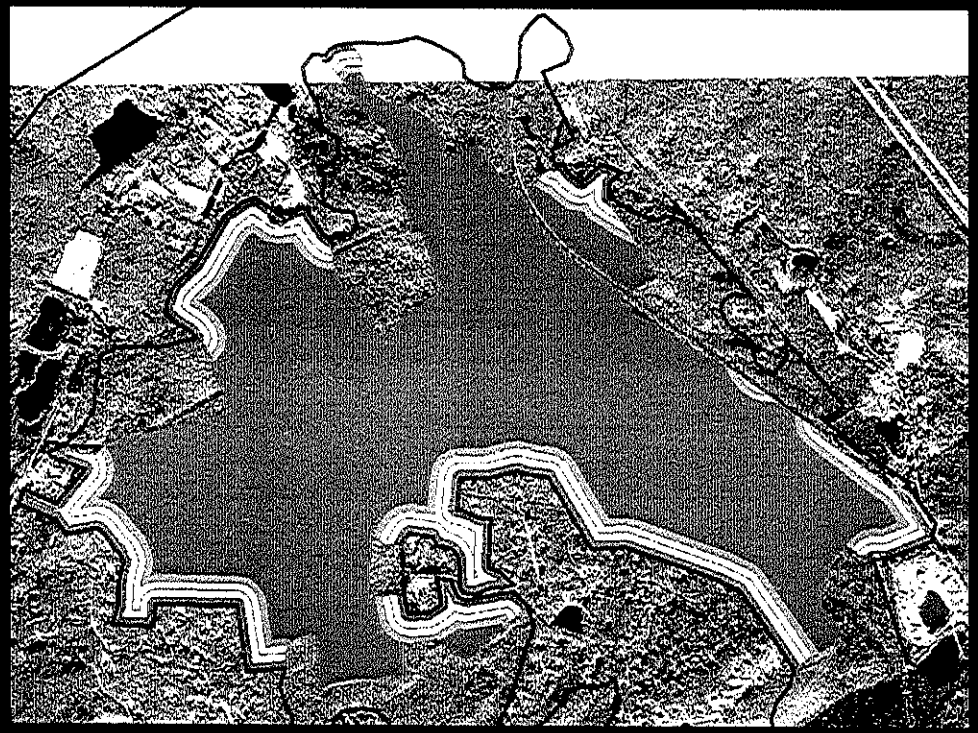
The Natural Resources Index

- Scale of 1-100
- Score of 100 represents land in undeveloped state
- Score is a relative composite of
  - ↗ Ecological integrity
  - ↗ Environmental impact



Green-fringed orchid

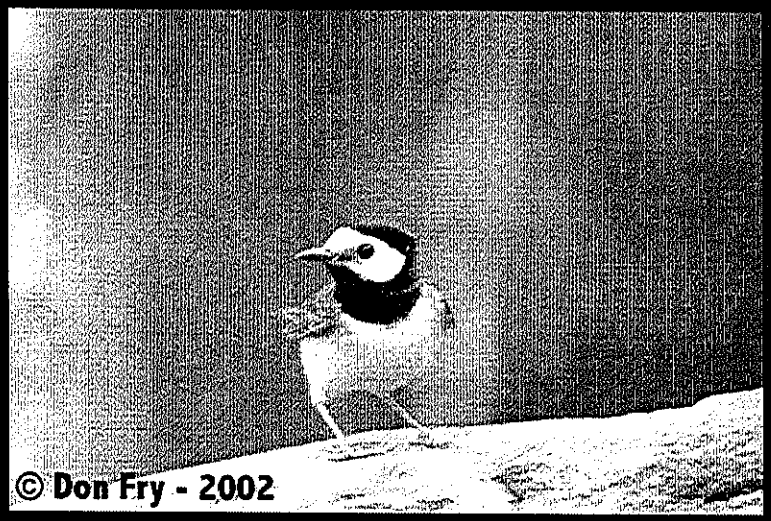
Natural Resources on the Preserve



- **Large intact forest--Index: 100**
- Buffer shown in 100′ increments to 400′

Forest Resources

- Area-sensitive species: worm-eating warbler, hooded warbler, scarlet tanager, bobcat



Hooded warbler

Bobcat

Water Resources

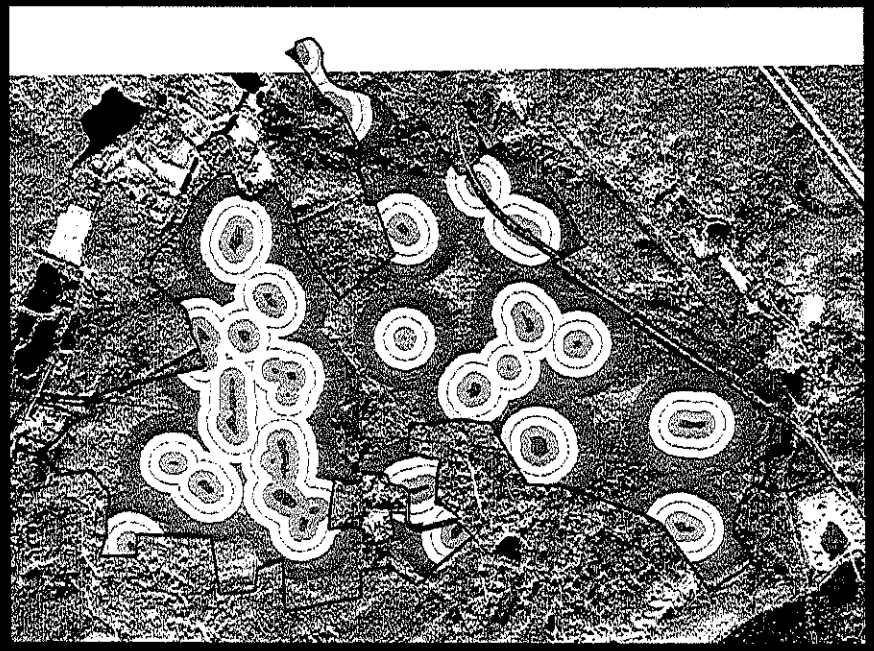
- Pequot Swamp Pond
- Class A Streams and headwater seeps
- Headwaters of Oyster River
- Riparian / natural buffers
- Natural resource index: 100

Dark green=wetlands;

Buffer shown in 50′ increments to 200′

Vernal Pools

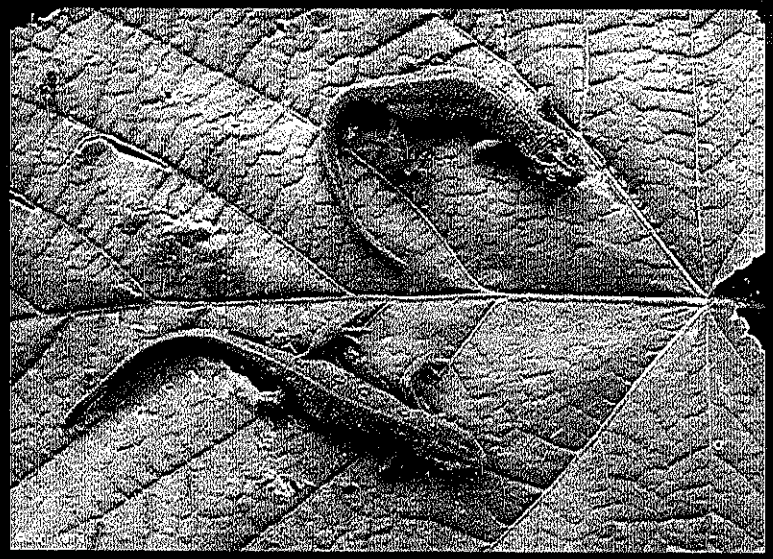
- 31 vernal pools
- Interconnected
- 750-foot upland areas critical habitat
- Natural Resource Index: 100



Dark Green=vernal pool
Buffers in increments up to 750'

Amphibian Populations

- 14 amphibian species
- Productive breeding habitats
- Amphibians inhabit 750′ surrounding upland forest, or more.



Red-spotted newt

Species of Special Concern

- Animals: Box turtle, red bat, ribbon snake
- Plants: Prickly pear (*Opuntia humifosa*), false hop sedge (*Carex lupuliformis*) and marsh milkwort (*Polygala cruciata)*

Polygala cruciata

Impacts of the Applicant's Proposal

- Resource impairment
  - Forest fragmentation
  - Negative Edge effects
  - Loss of wetlands connectivity
  - Habitat degradation
  - Water Quality Impairment

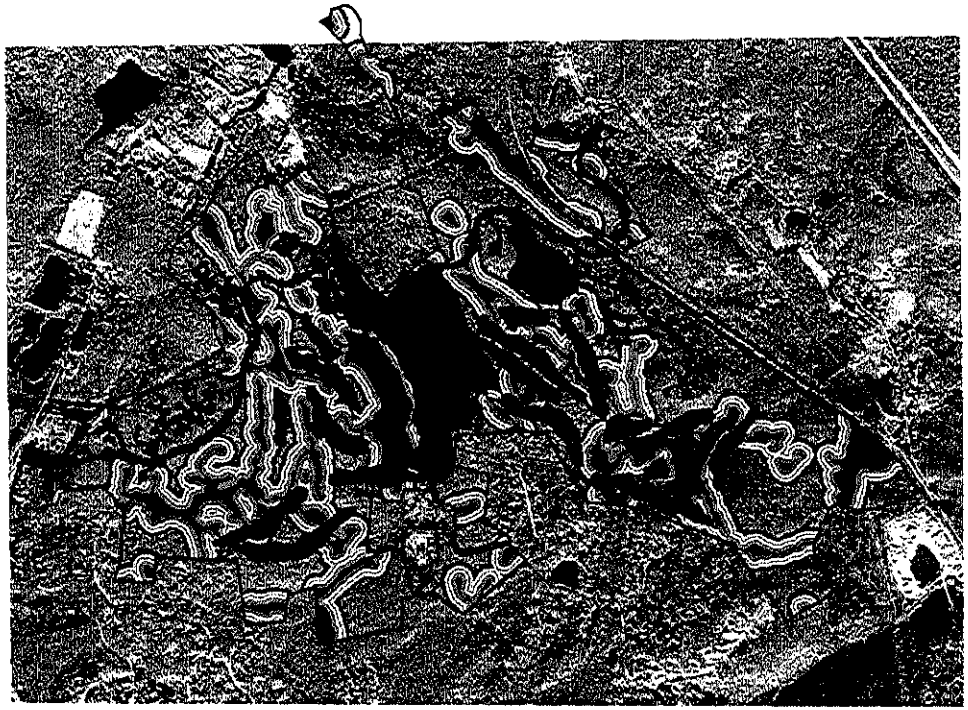
Forest Fragmentation

- Edge effects can extend 400′,or more
- Six small core patches remain
- Natural Resource index: 42

Dark green = quality forest core

Impact on Water Resources

- Sedimentation and siltation Impacts
- Nutrient Enrichment and degradation
- Impacts from Toxic Pesticides used in golf course and landscaped areas
- Hydrologic impacts
- Natural resource index: 83

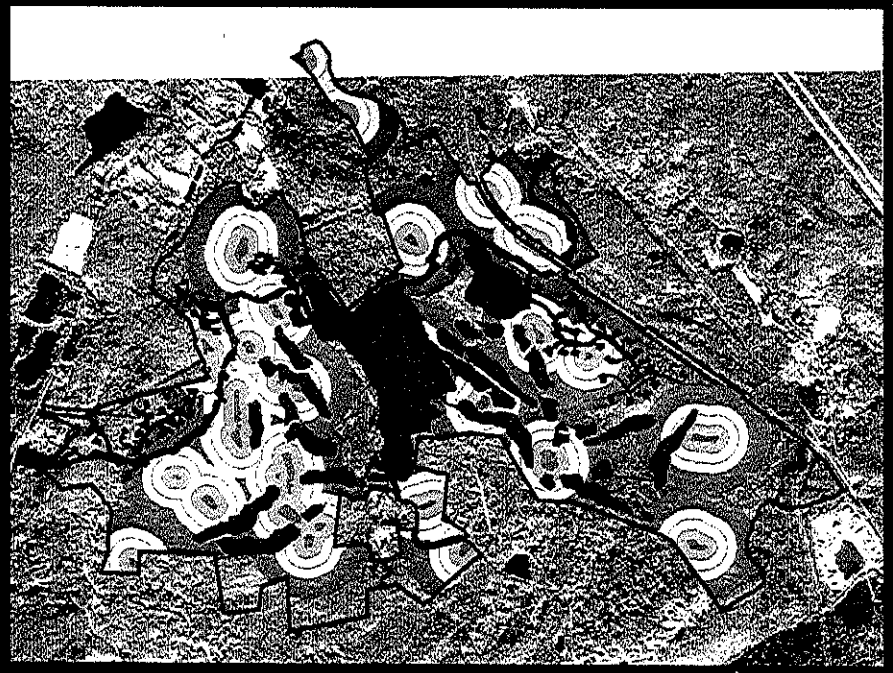


Dark green=wetlands; Lighter green= 100′ buffers

Impact on Vernal Pool Habitat

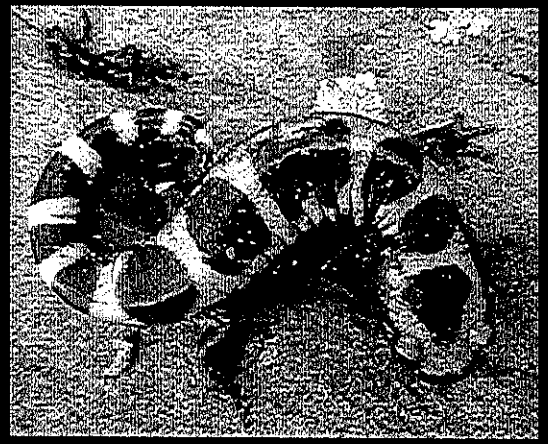
- Many vernal pools and adjacent upland areas are impacted by the proposed development

- Natural Resource Index: 76



Applicant's Integrated Pest Management Plan

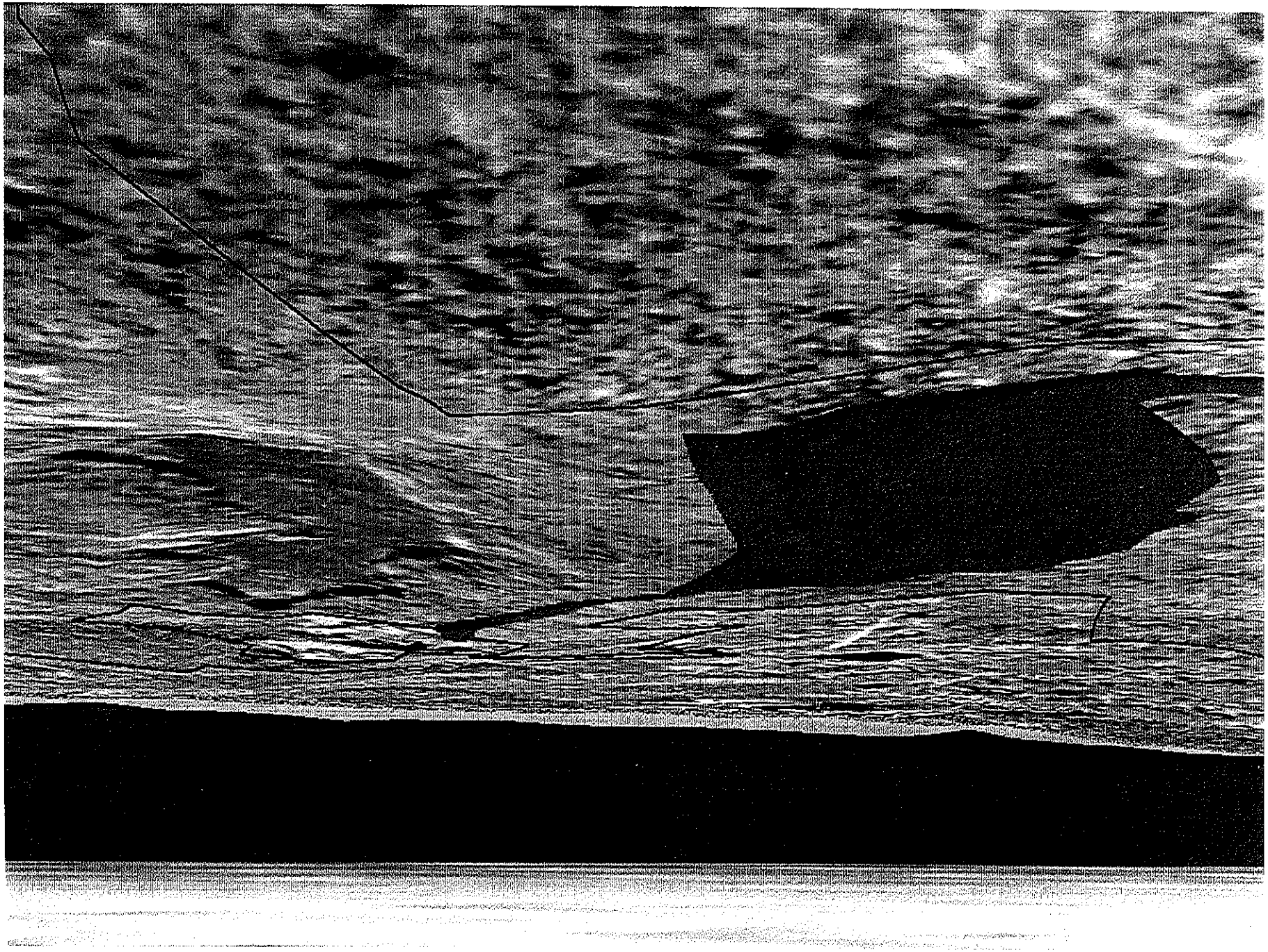
- Lists 9 of 12 toxic pesticides identified as high risk by the EPA
- Allows application within 25 feet from a water feature
- Fails to apply IPM principle of "spot treatment only"
  - Allows treatment of 20% of the entire course at one time

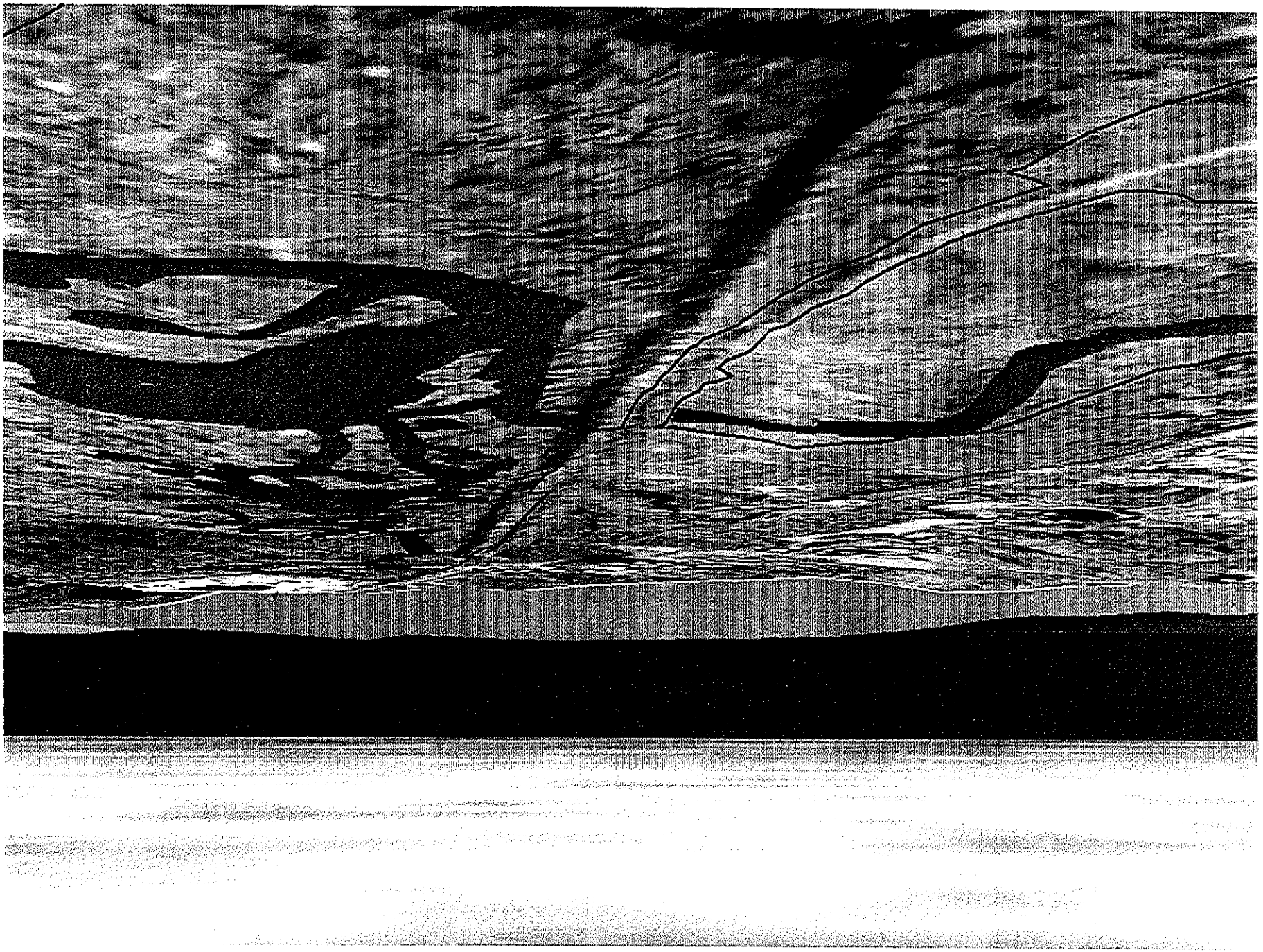


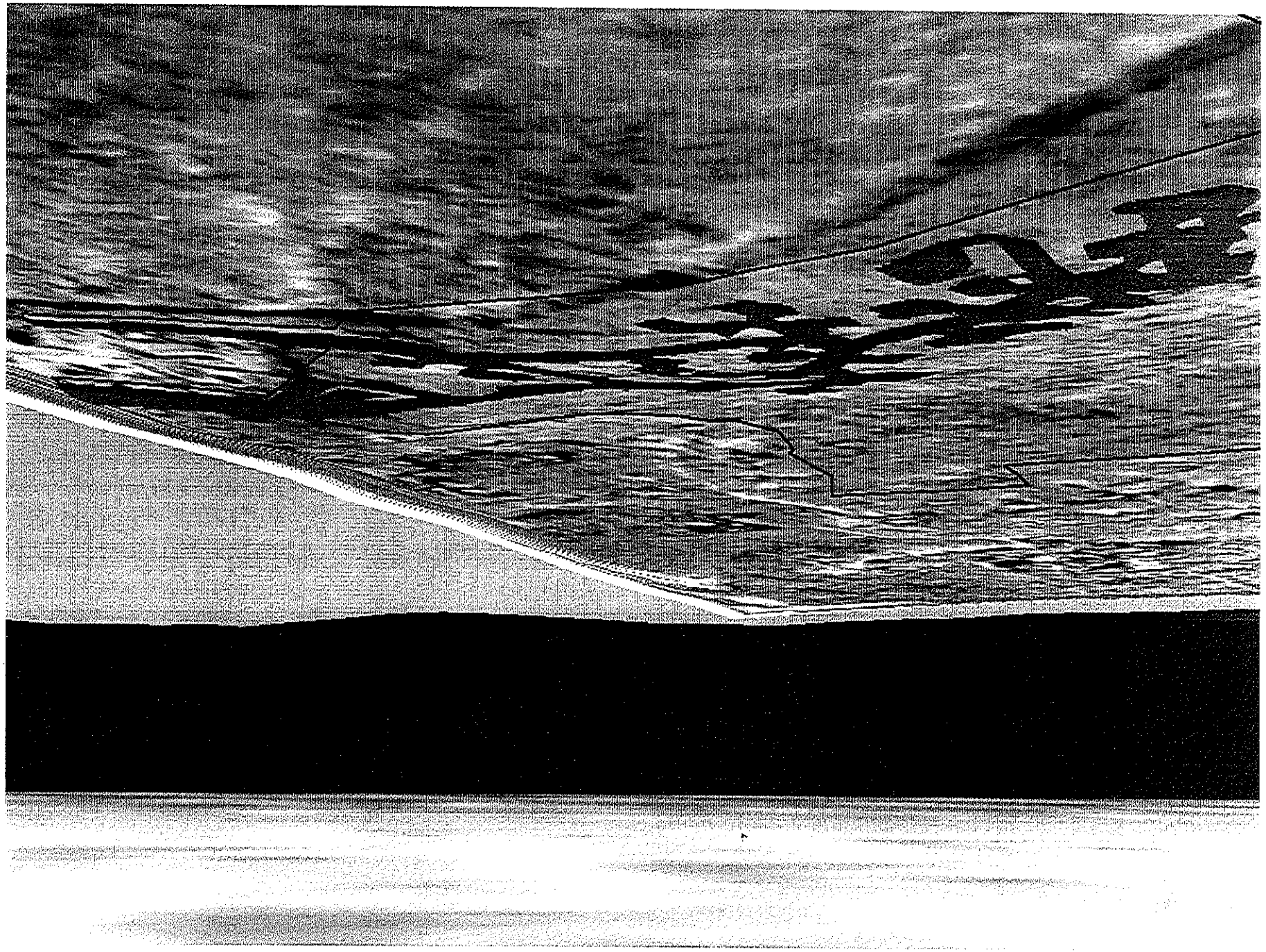
Marbled salamander

A Better Alternative: A *Real* Open Space Subdivision

- Golf course and spine road eliminated
- Same density, more clustered
- Larger forest blocks preserved
- Less habitat fragmentation
- Lower density, more clustering would allow even better alternative

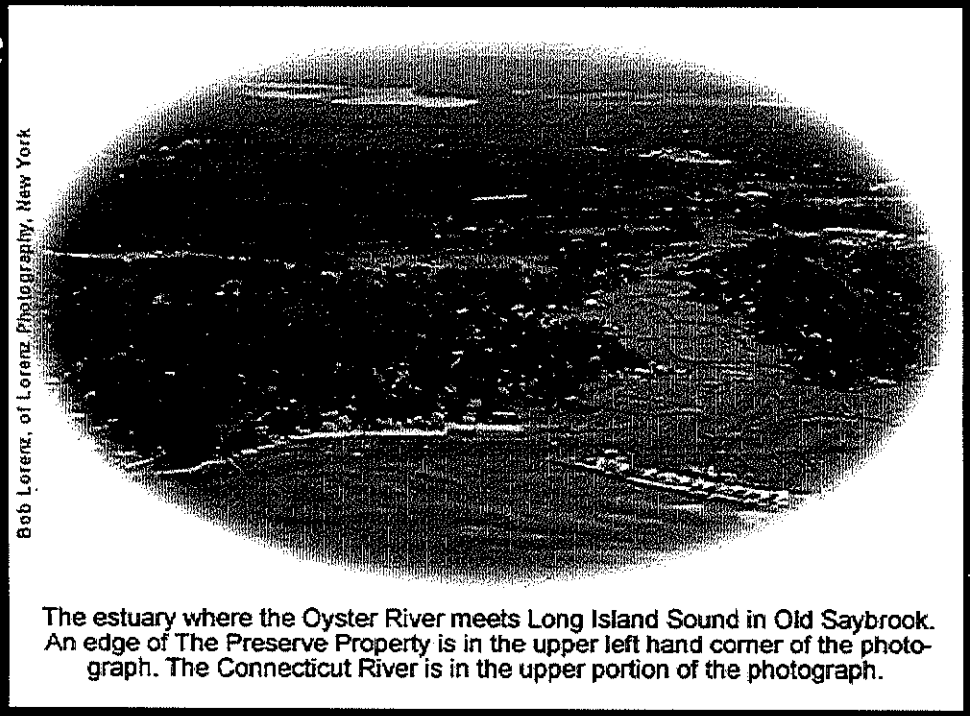






It's All About the Future

- Old Saybrook is the shepherd of our natural resources
- Does the applicant's proposal qualify for approval?



The estuary where the Oyster River meets Long Island Sound in Old Saybrook. An edge of The Preserve Property is in the upper left hand corner of the photograph. The Connecticut River is in the upper portion of the photograph.

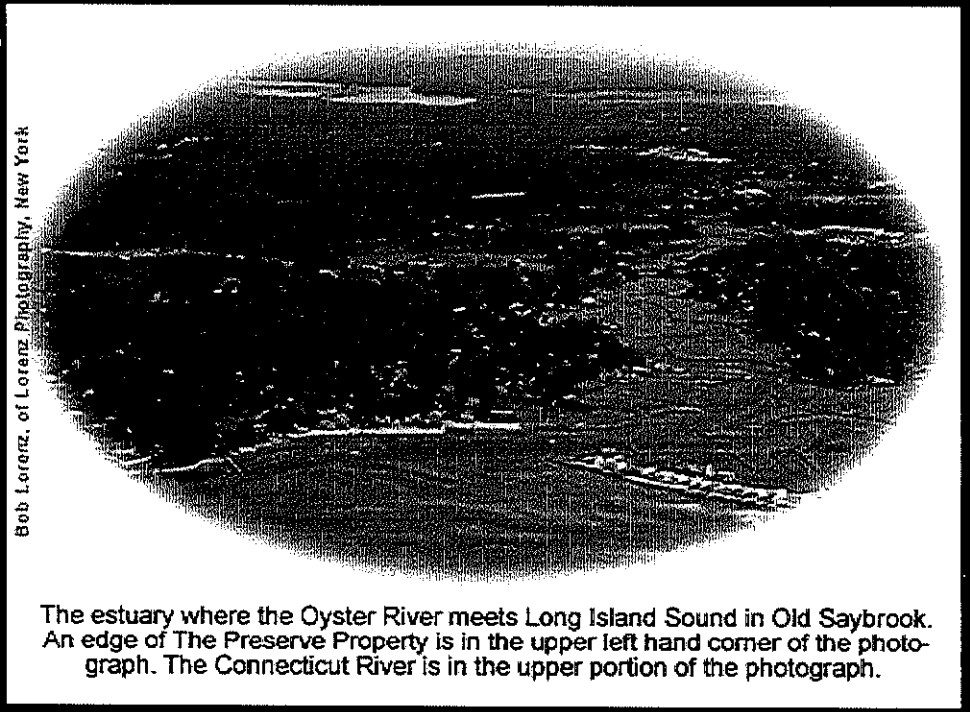
Requirements for Approval of an Open Space Subdivision

- Quality Open Space—50% or more
- Preservation of natural, scenic and cultural resources
- Number of units no greater than conventional subdivision
- Protection of health, safety and property values

Are you satisfied?

It's All About the Future

- Old Saybrook is the shepherd of our natural resources
- Does the applicant's proposal qualify for approval?



The estuary where the Oyster River meets Long Island Sound in Old Saybrook. An edge of The Preserve Property is in the upper left hand corner of the photograph. The Connecticut River is in the upper portion of the photograph.

Do the Right Thing

- Deny the application and require the applicant to redesign the project
  - The proposal does not measure up under the regulations
  - It will impair natural resources
  - Better alternatives exist

Scarlet tanager