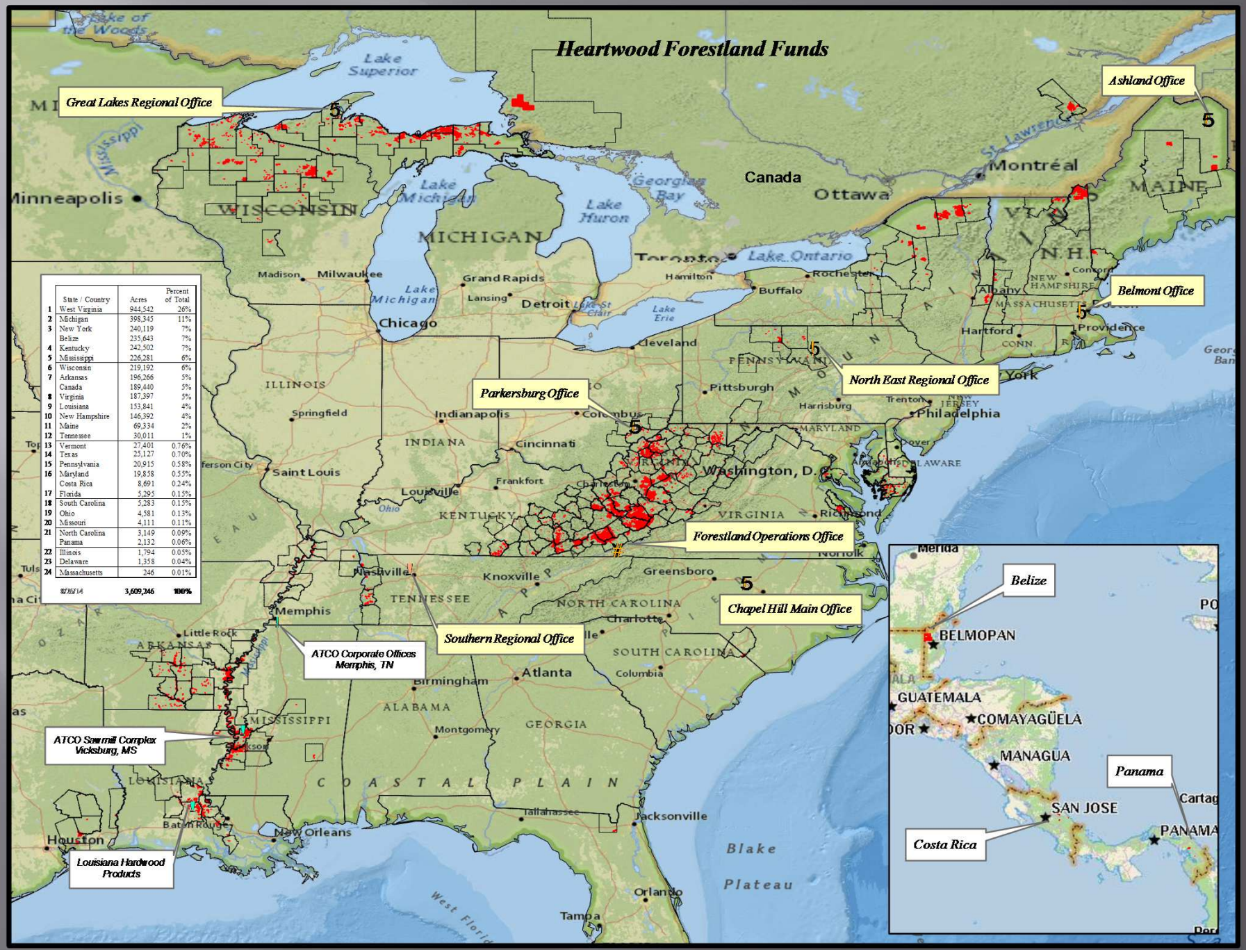
- Great Lakes Region office in Toivola, MI
- Head Office in Chapel Hill, NC
  - 3,625,000 acres under management
    - 24 US States
    - 2 Canadian Provinces
    - 3 Central American Countries
  - Great Lakes Region
    - 10 Properties – Wisconsin, Michigan, Ontario
    - 785,000 acres
    - Two regional foresters, 1 administrative asst.
      - Three consulting forestry companies:
        - Grossman Forestry
        - Compass Land Consultants
        - Prentiss & Carlisle

The Forestland Group



	State / Country	Acres	Percent of Total
1	West Virginia	944,542	26%
2	Michigan	398,345	11%
3	New York	240,119	7%
	Belize	235,643	7%
4	Kentucky	242,502	7%
5	Mississippi	226,281	6%
6	Wisconsin	219,192	6%
7	Arkansas	196,266	5%
	Canada	189,440	5%
8	Virginia	187,397	5%
9	Louisiana	153,841	4%
10	New Hampshire	146,392	4%
11	Maine	69,334	2%
12	Tennessee	30,011	1%
13	Vermont	27,401	0.76%
14	Texas	25,127	0.70%
15	Pennsylvania	20,915	0.58%
16	Maryland	19,858	0.55%
	Costa Rica	8,691	0.24%
17	Florida	5,295	0.15%
18	South Carolina	5,283	0.15%
19	Ohio	4,581	0.13%
20	Missouri	4,111	0.11%
21	North Carolina	3,149	0.09%
	Panama	2,132	0.06%
22	Illinois	1,794	0.05%
23	Delaware	1,358	0.04%
24	Massachusetts	246	0.01%
	8/28/14	3,609,246	100%

REGENERATION IN THE WAKE OF BEECH BARK DISEASE SALVAGE HARVESTS

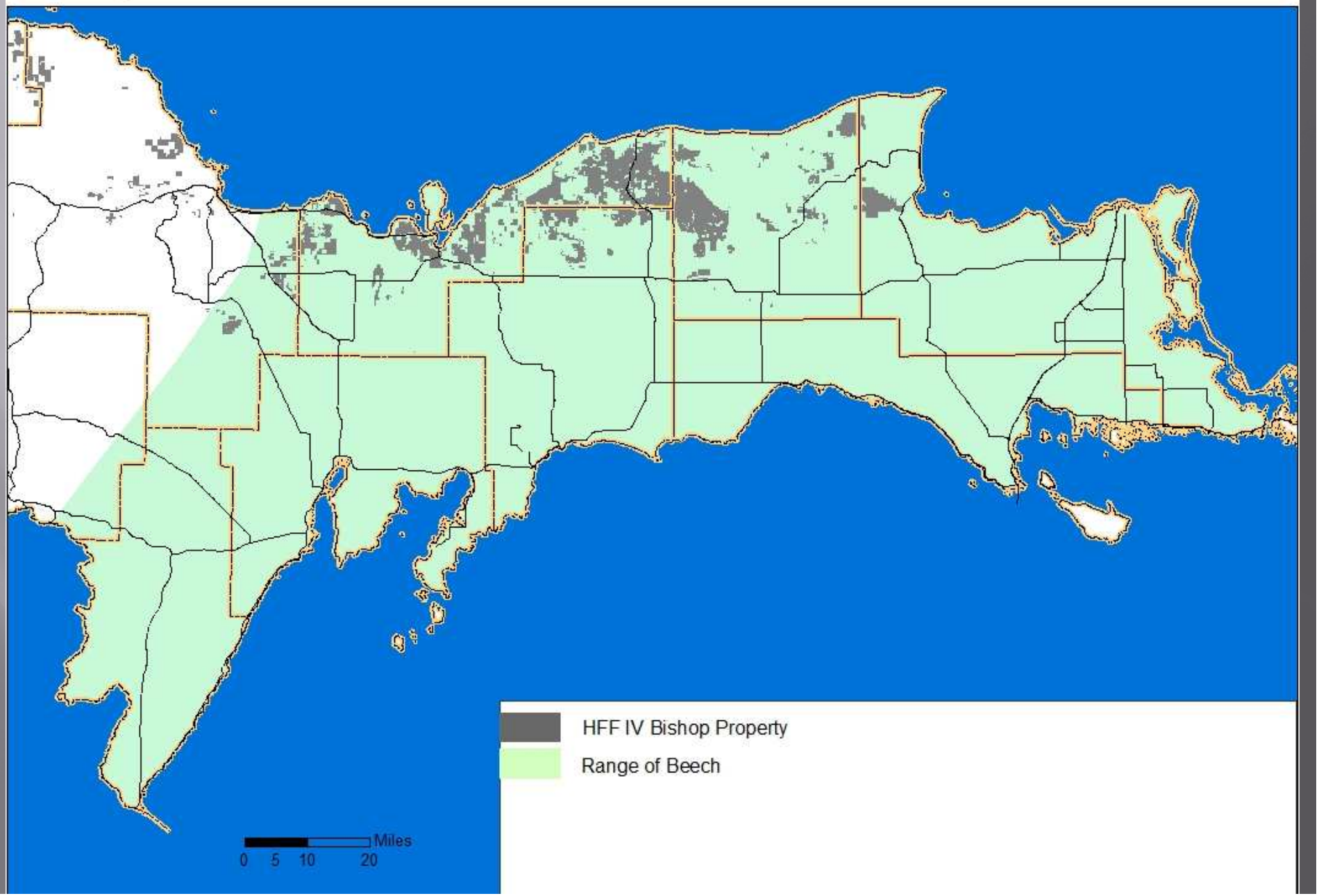
EASTERN UPPER PENINSULA

The BBD Challenge

2003 Acquisition of Bishop Property

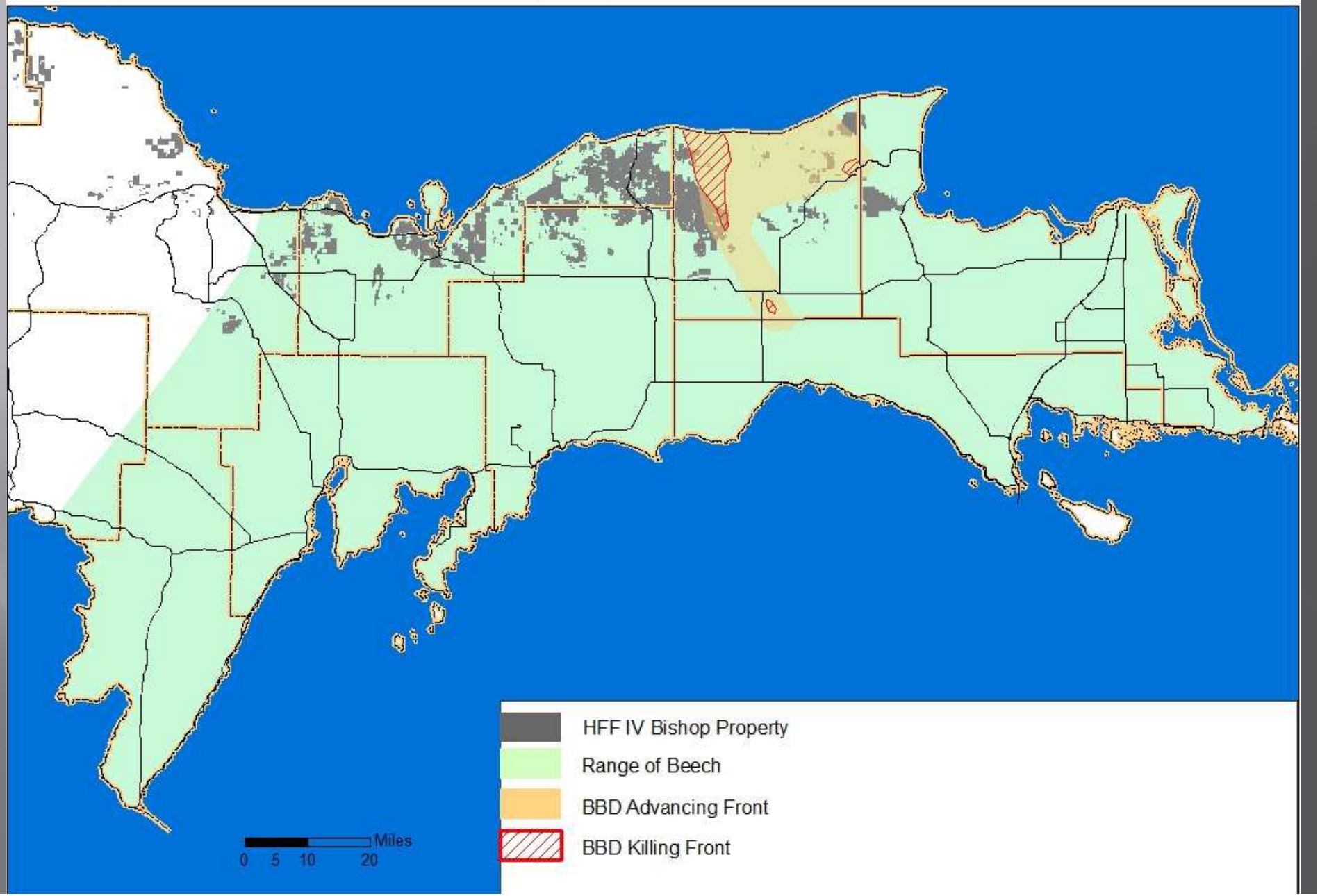
- 270,000 acres in Beech range
- 97 MMBF & 550,000 cords of Beech

HFFIV - Bishop Property
Range of Beech



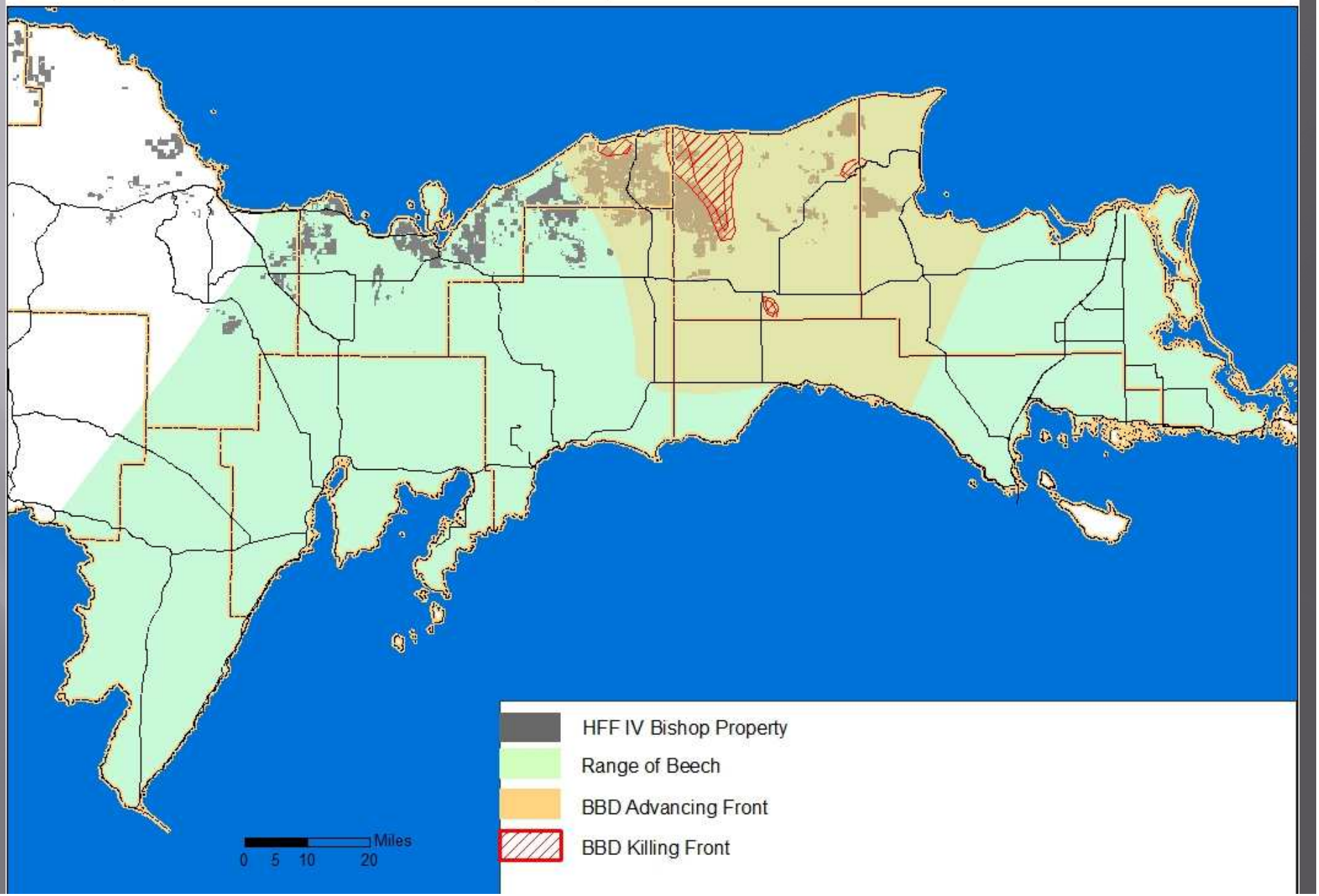
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2001



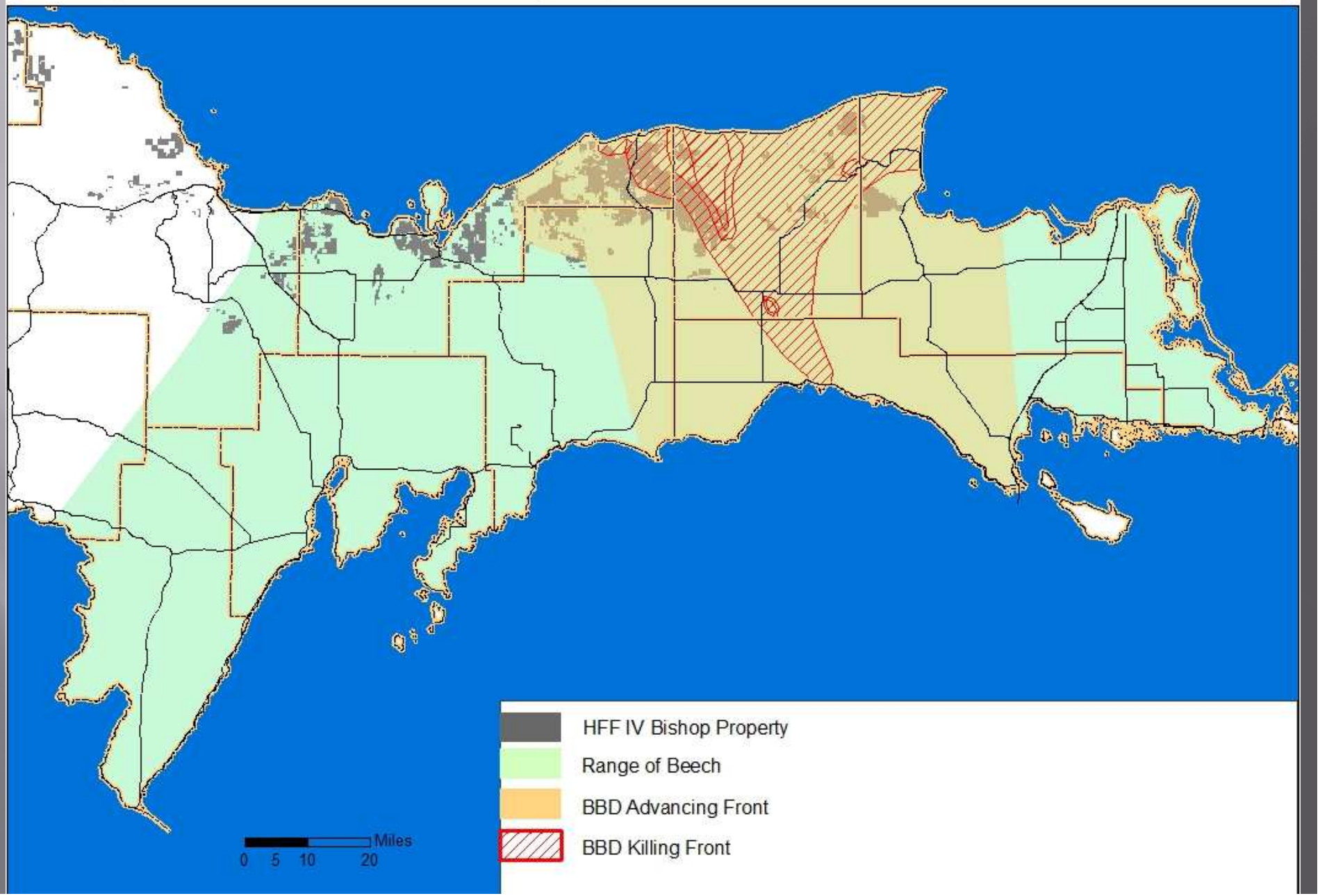
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2003



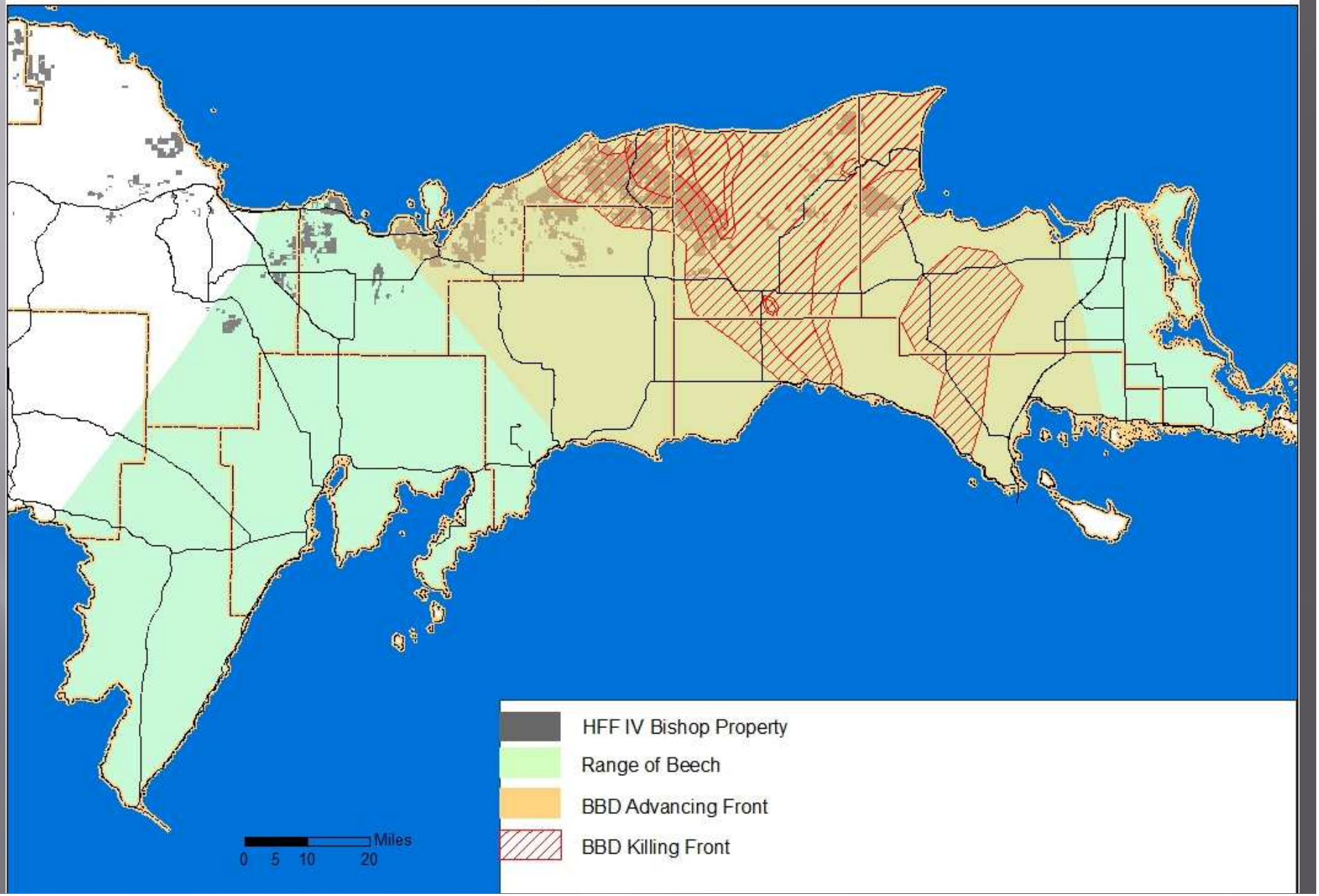
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2005



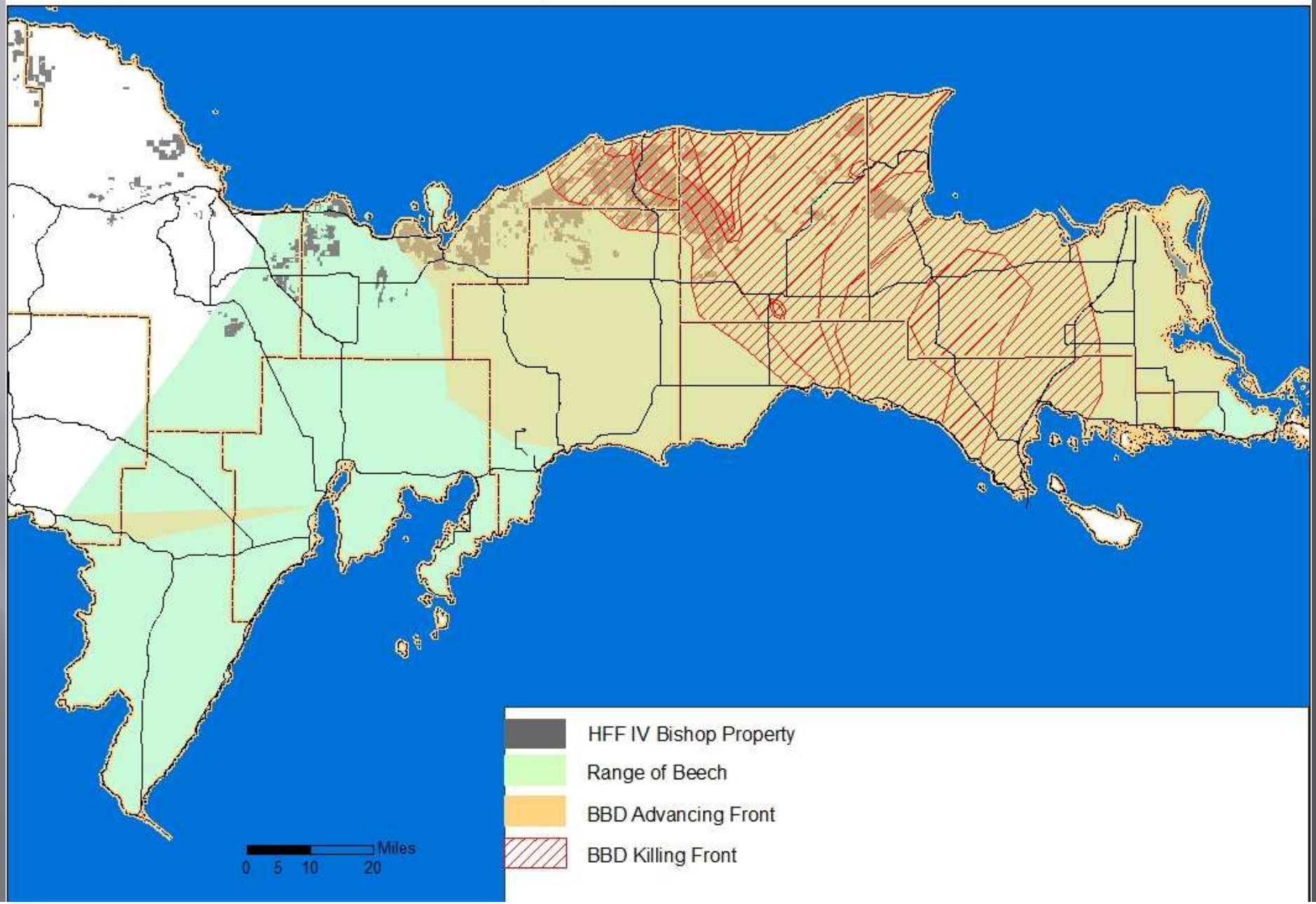
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2007



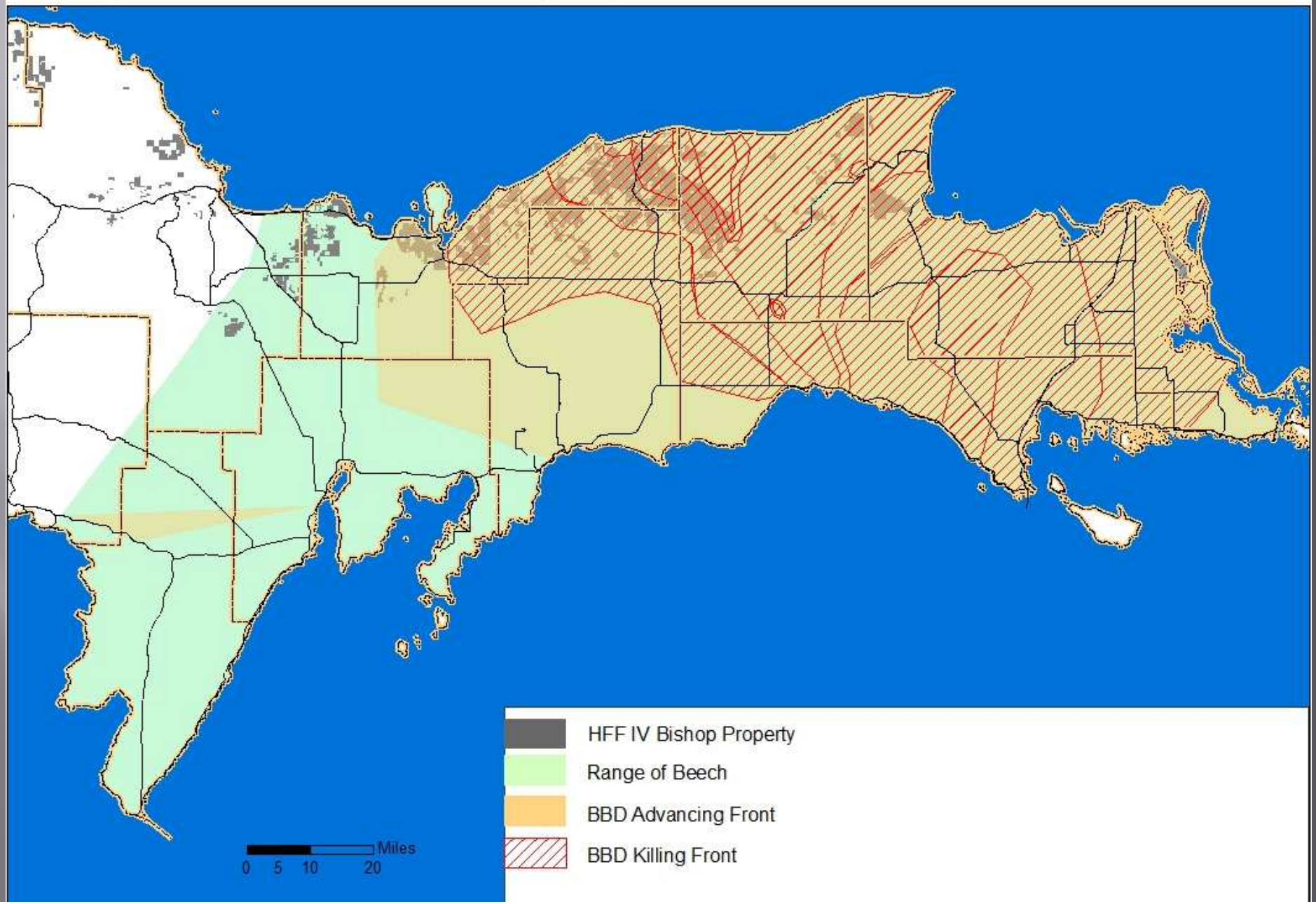
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2009



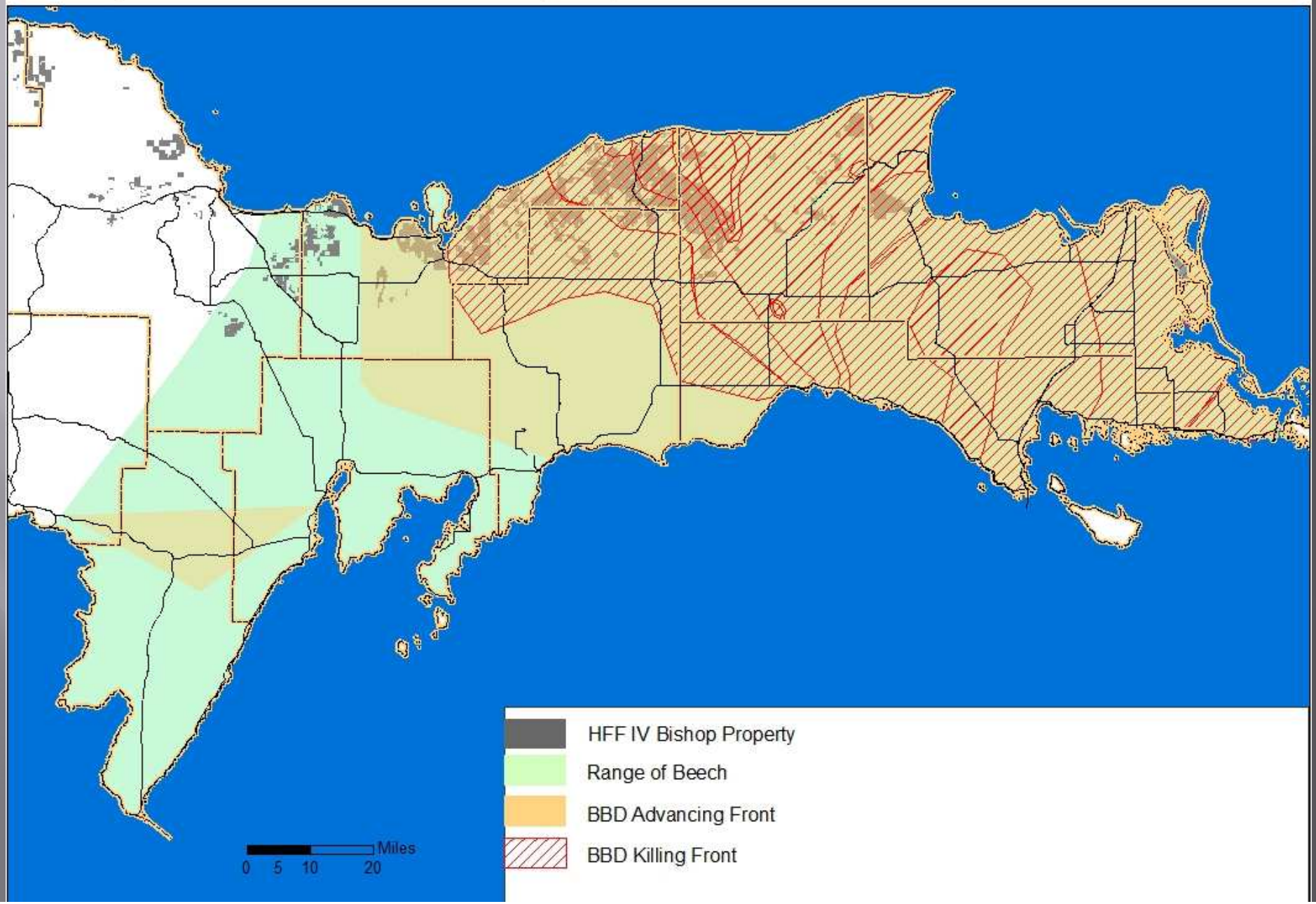
HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2011



HFFIV - Bishop Property
Progression of Beech Bark Disease (BBD)

2012



Management Approach

- Normally we would be managing northern hardwoods with a 12-15 year rotation using single tree selection silviculture
- How do we approach a situation that will require a drastic deviation from this?

Management Approach

- TFG's Public Image
  - TFG is "new kid in town"
  - High outdoor recreation area
  - Community rooted in timber industry
  - Drastic Change in Management Scheme

Management Approach

- TFG's Public Image
  - TFG is "new kid in town"
  - High outdoor recreation area
  - Community rooted in timber industry
  - Drastic Change in Management Scheme

- Notify and educate public
  - Community Leaders tour
    - Educate prominent people in the community to spread our message.

Management Approach

- Inventory
  - Short-term
    - Aerial Surveys
      - Direction for initial sale prep as well as inventory efforts.

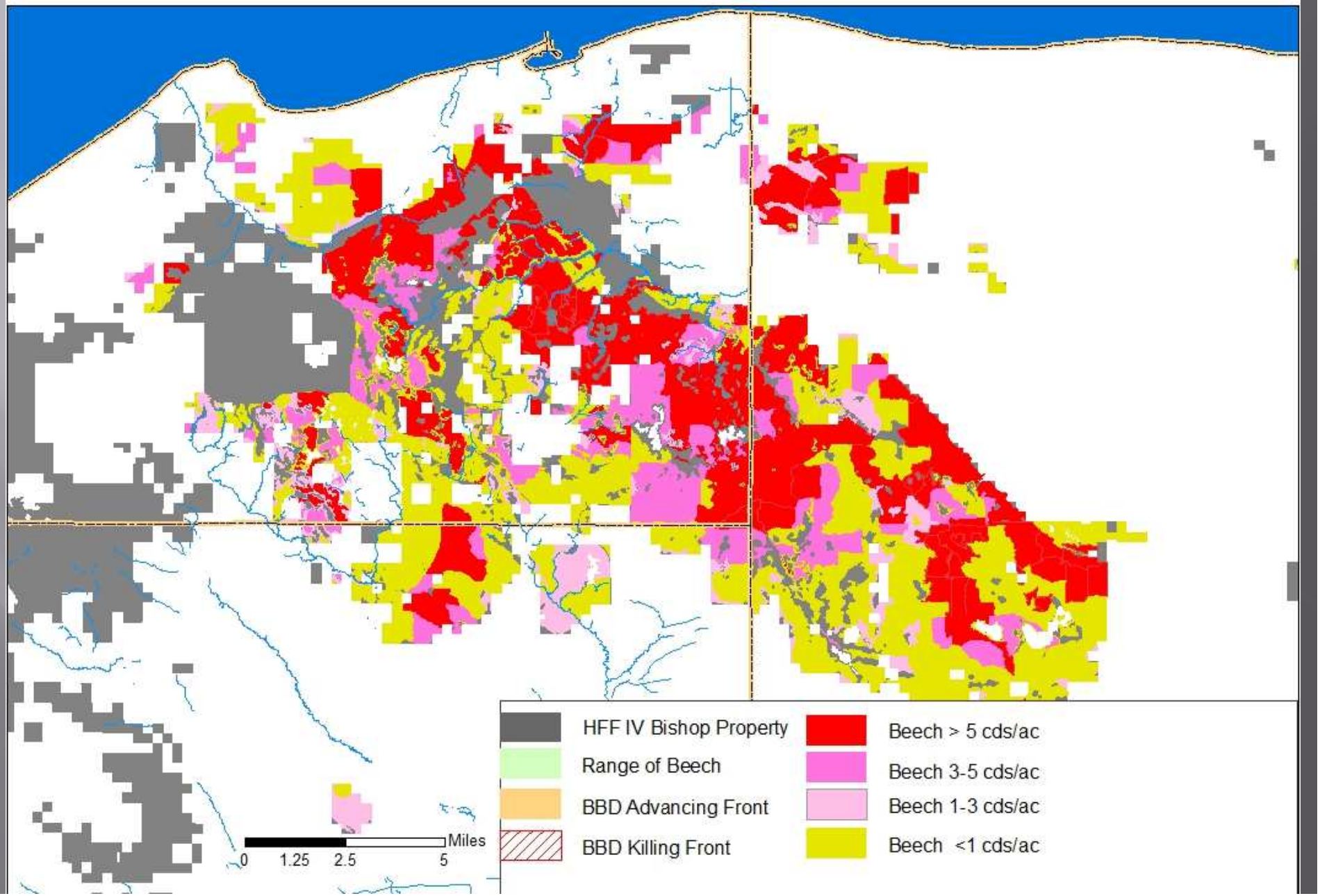
Aerial Surveys

Management Approach

- Inventory
  - Short-term
    - Aerial Surveys
      - Direction for initial sale prep as well as inventory efforts.
  - Systematic
    - Accelerated stand-level inventory
      - Dedicated all of the property's inventory resources to the BBD effort.
    - Prioritization of stands for treatment
      - Priority 1 = 5+ cds/ac. Salvage ASAP
      - Priority 2 = 3-5 cds/ac. Salvage if convenient with P1 or once P1 are complete.
      - Priority 3 = 1-3 cds/ac. Salvage small stands if convenient or after P2 are complete

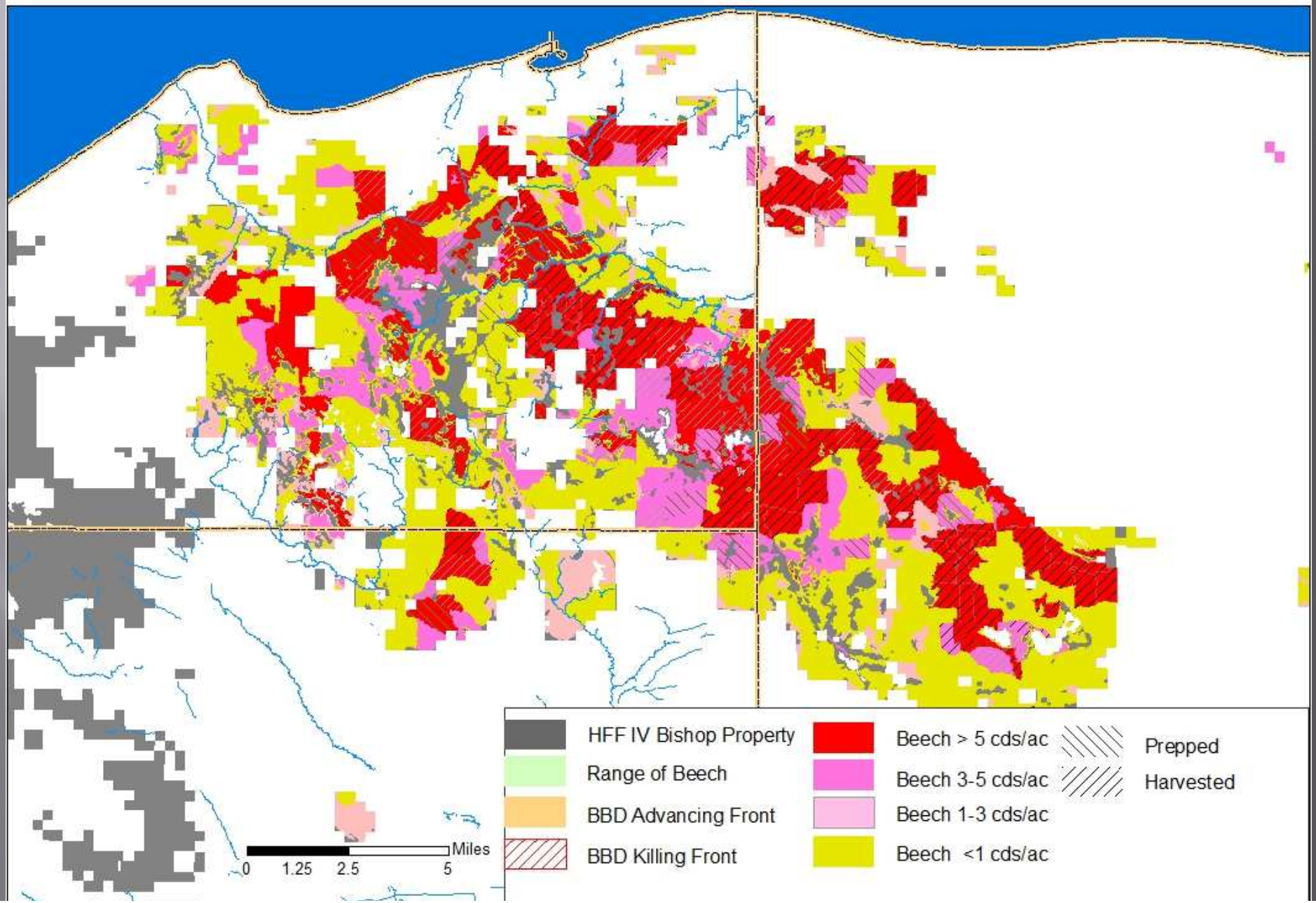
HFFIV - Bishop Property
Prioritization of Stands for Treatment

2006



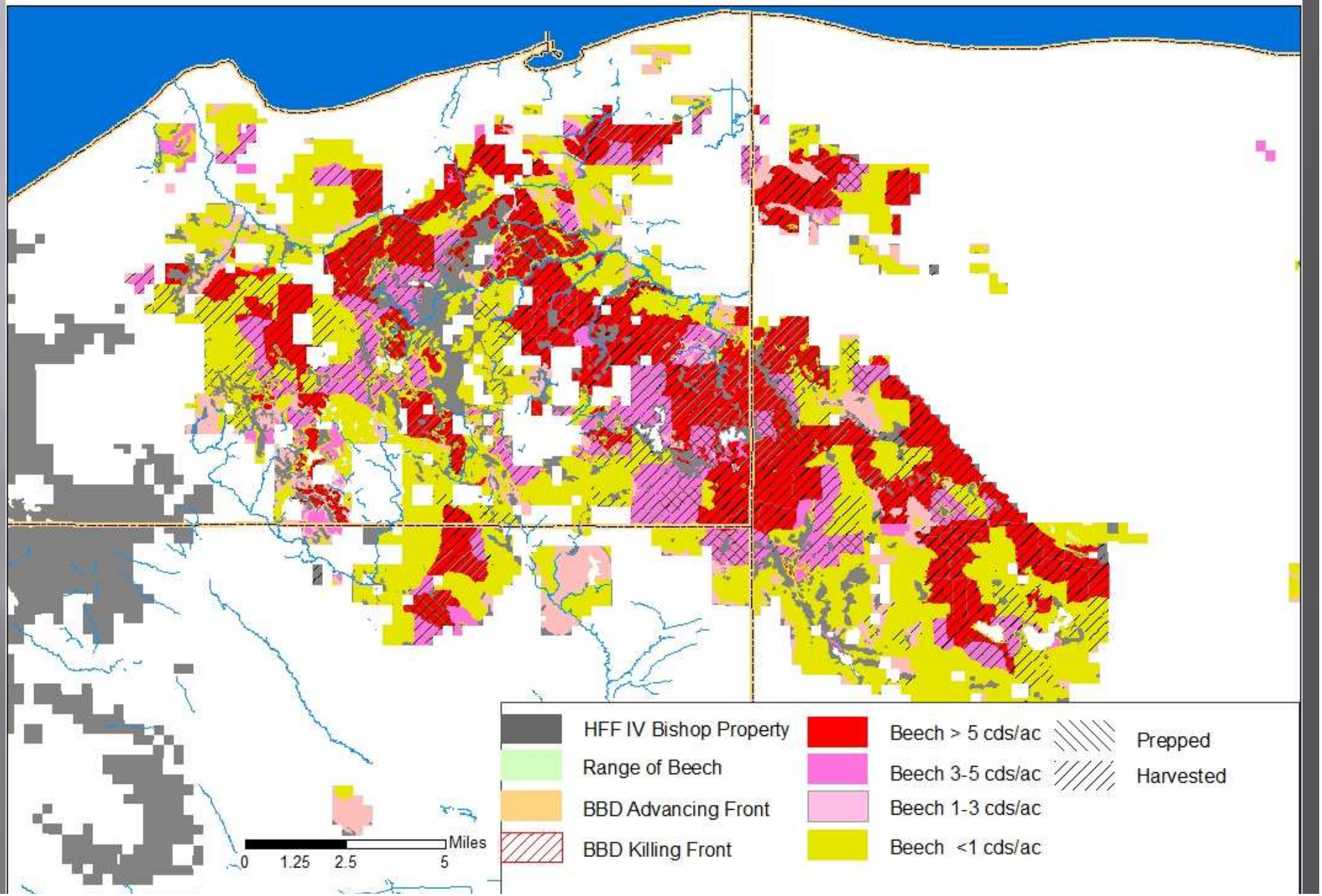
HFFIV - Bishop Property
Prioritization of Stands for Treatment

2008



HFFIV - Bishop Property
Prioritization of Stands for Treatment

2014



Management Approach

- Infrastructure
  - Maximize salvage effort throughout the year
  - Sandy soils and a relatively well roaded property.
  - Upgrades required for year-round operations (through spring breakup).
    - Salvage harvests operated through breakup every year.

Management Approach

- Allocation of Annual Allowable Cut
  - Shifted entire property (390,000 acres) AAC to the beech salvage effort.
- Silviculture??
  - Based on non-beech residual
    - Ranged from 0 to 70 sq. ft. in large patches
    - Next entry likely to be 20 yrs in many stands
    - Remove poor quality and mature non-beech stems
    - Mindful of windthrow exposure for residual stems
      - Loose, sandy soils
  - Where beech was heavy - dubbed a "bastardized shelterwood"
    - Combination of shelterwood and single tree selection with softwood and yellow birch seed trees, where available.
    - Retain beech regen and BBD resistant stems.
  - Not trying to eliminate beech from the landscape.

Management Approach

- Regeneration Plan
  - What is already there?
    - Sufficient non-beech regeneration?
    - Can it be protected during harvest?

Sufficient non-beech regen, post-harvest

Management Approach

- Regeneration Plan
  - What is there?
    - Sufficient non-beech regeneration?
    - Can it be protected during harvest?
  - When there's not enough…
    - Clearcut and plant pine?
      - Historical data shows these stands were hardwoods
      - FSC certification issues
    - Beech thickets?
      - Not like the literature describes in the NE US
      - Our theory on why it's not an issue here
      - Some places do have good seed-based beech regen

Some stands had large areas of nearly 100% beech

Which can lead to large canopy gaps with nothing but beech regen established in them.

…or somewhere in between

Management Approach

- When there's not enough (continued)…
  - Sufficient non-beech seed source?
    - If so, leave to natural regeneration
  - Supplemental planting
    - Historical data also shows a larger softwood component to the hardwoods
      - Primarily white pine, hemlock, balsam fir, but all regional species

Management Approach

- When there's not enough (continued)…
  - Sufficient non-beech seed source?
    - If so, leave to natural regeneration
  - Supplemental planting
    - Historical data also shows a larger softwood component to the hardwoods
      - Primarily white pine, hemlock, balsam fir, but all regional species
      - Partnerships
        - Opportunities for diversity
          - DNR federal wildlife grant
        - Rehabilitation of habitat
          - MI DNR, Alger Sportsman's Club, UP Whitetails – and Alger Co. Chapter, Superior Watershed Partnership

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

DEPARTMENT OF NATURAL RESOURCES DNR MICHIGAN

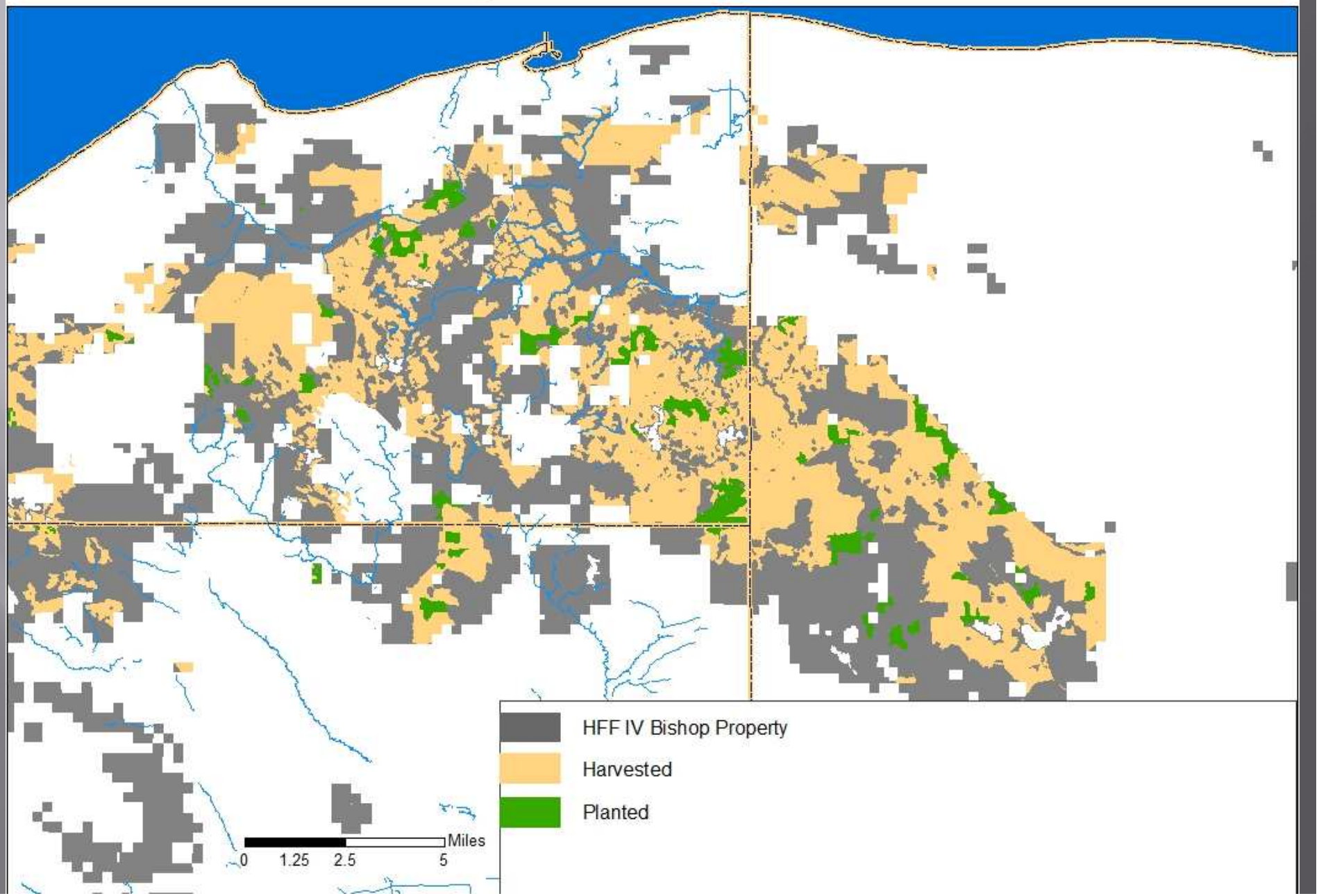
U.P. Whitetails Association, Inc.

Management Approach

- When there's not enough (continued)…
  - Supplemental planting (continued)…
    - Commercially marketable species desired
      - Site sensitive – droughty soils now exposed to full sun
        - What about the edges?
      - Site-prep or not?
        - Herbaceous competition
          - Raspberries – Smuckers where are you?
        - Residual stems and established regen.
          - Prevents aerial herbicide or mechanical treatment
          - Also site competition
        - Hand herbicide application
          - Expensive
          - Difficult to follow up with planting due to scattered nature of stands
      - How to beat the competition
        - Larger seedlings
        - Containerized roots

HFFIV - Bishop Property
Stands Planted after BBD Salvage

2014



Planting Summary

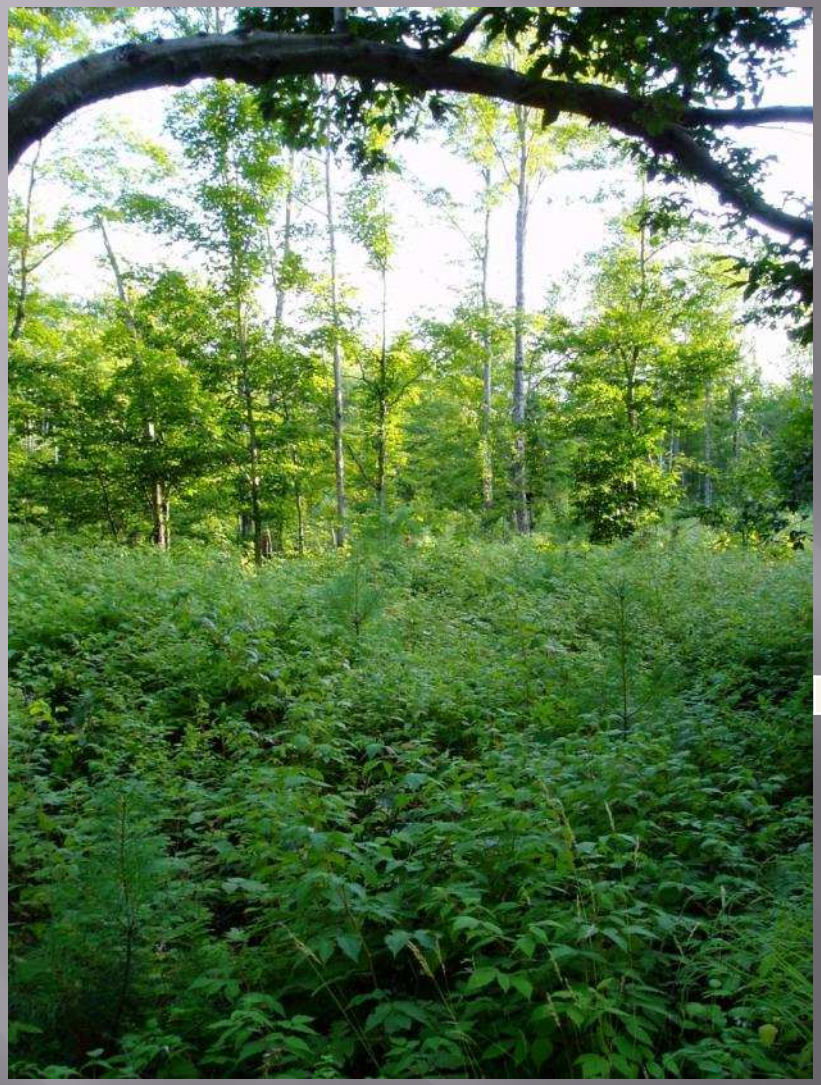
Funding Source	Year	Acres	Additional Partners	
HFFIV				
	2003	6		
	2004	25		
	2005	197		
	2006	373		
	2007	268		
	2008	557		
	2009	278		
	2010	305		
	2011	802		
	2012	280		
	2014	255		
Total HFF IV		**3,346**	**67%**	
DHIPI*			MI DNR and:	
	2010	298	Alger Sportsman's Club,	Alger Co. UP Whitetails
	2012	263		
	2013	140	UP Whitetails	
	2014	112	UP Whitetails	
		813		
LIP**			MI DNR	
	2004	404		
	2005	130		
	2008	25		
		558		
WHGP***			MI DNR and:	
	2014	255	Superior Watershed Partnership	
		255		
Total Non-HFF IV		**1,626**	**33%**	
Grand Total		**4,971**		

Landowner Incentive Program (LIP)

2004 – MI DNR, Wildlife Division (non-game) approached us with a new program funded by US F&W.

- Project to promote mesic conifers in hardwood dominated landscapes (which Bishop fit very well) for wildlife diversity enhancement.
- 100 % funding of planting projects
  - White Pine, Hemlock, White Spruce preferred by DNR
  - We convinced them to add Red Oak and Red Pine
- HFFIV Project: Free-planted around slash in salvaged stands with low residual BA and/or high beech regen (vs. maple, etc.)
- Planted approx. 560 acres over 4 years.

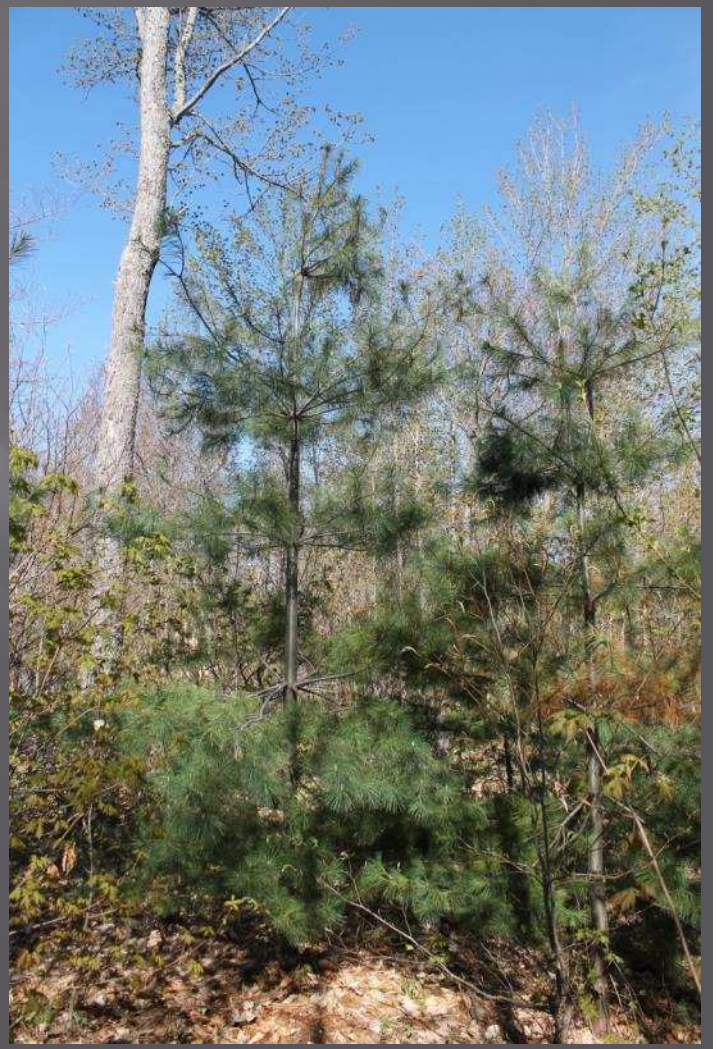
Planting – LIP 2004



2004 LIP White Pine in 2008…

in 2010…

and in 2014



Deer Habitat Improvement Program Initiative (DHIPI)

2010 – MI DNR, Wildlife Division, approached us with two partners to fund deer habitat improvement.

- Generally we are not interested in promoting higher deer populations, and made this known to them.
- We worked with them in the context of promoting late season, "pre-yarding" habitat that keeps deer spread on the landscape and available to hunters for more time and reduces over-browsing in the winter yards – where we have the most problem with regen.
- Now in our third year
- Over 875 acres planted.

2013 DHIPI
Red Oak

Wildlife Habitat Grant Program (WHGP)

Funding from hunting licenses (MI DNR)

2014 – Superior Watershed Partnership

- DNR funding supplied Red Oak saplings, Spruce and White Pine, in addition to HFF IV supplied red pine on 300 acres.

WHGP - 2014 Red Oak Saplings

HFFIV Plantings

Focused more on commercially valuable species.

- Primarily Red Pine
- Red Oak
  - Recognizing the impact of lost mast crop
  - Desire to plant commercially valuable species
- White Pine mixed in
  - For landscape diversity and wildlife value
- Learned some lessons from early LIP plantings
  - Fall planting on droughty soils gets seedlings established before summer drought.
  - Using "double-flushed" or 2 yr containerized red pine
    - Free to grow in first year, to get a jump on herbaceous competition
    - No need for herbicides or other site prep.

Results - Planted sites

- Measures of success
  - Individual seedling success
    - Softwoods: above herbaceous competition and away from encroaching canopy
    - Hardwoods: above browse impacts (and encroaching canopy if intolerant).
  - Planting success
    - Difficult to measure due to free-planted nature, but evident in most stands.
    - Would require significant inventory effort
  - Stand success
    - Full stocking with quality stems of commercial species.

2007 Double-Flushed Red Pine in 2008…

in 2010…

…and in 2014

2005 1-yr Red Pine in 2012

2006 Red Oak, Red Pine in 2014

Some learnings

- Issues we have observed:
  - Poor seedling condition (LIP first year)
  - Bare-root vs. containerized
    - Exacerbated by droughty soils
  - Spring vs. Fall planting
  - Red Pine – Double-flushed or 2 year old vs. 1 yr old
  - Planting micro-site – maintain distance to residual stems with intolerant species – planting supervision.?
  - Dear, dear, DEER!! Success for oak = above deer browse-ability (7 ft.??)

Results - Natural regen sites

- Generally successful

Where non-beech regen was established and protected during the harvest

Results - Natural regen sites

- Generally successful
  - Some patches will take some time.

Establishing natural regeneration

Seed tree regeneration

Results - Natural regen sites

- Generally successful
  - Some patches will take some time.
  - Sometimes it depends on where you look, and at what scope.

Look one direction and see plenty of regen…

Look the other direction and see not so much.

Results - Natural regen sites

- Generally successful
  - Some patches will take some time.
  - Sometimes it depends on where you look, and at what scope.
  - Most stands have natural regen establishing.

Maple is establishing naturally…

You just have to look closer and not panic

The Big Burning Question:

- Dear, dear, DEER!!
  - Even in snow-belts, regen is being significantly impacted.

There is a reason much of the maple is still below the herbaceous layer.

The Big Burning Question:

- Dear, dear, DEER!!
  - Even in snow-belts, regen is being significantly impacted.
    - Not just the extra years to breech the browse barrier
    - What kind of shape will they be in once they are free to grow?

Will we get a quality stem from this?

Results - Natural regen sites

- Generally successful
  - Some patches will take some time.
  - Sometimes it depends on where you look, and at what scope.
  - Most stands have natural regen establishing.
  - There are some patches where competition or browsing have prevented a good response.
    - What to do?
      - Herbicide and plant pine?
      - Wait for the maple to establish?
      - As a whole, the stands are regenerated sufficiently – leave these patches as wildlife openings, which will eventually fill in?