

# Memorandum

To: Idaho Water Resource Board

From: Cynthia Bridge Clark

Date: July 16, 2019

Re: Water Storage Committee Meeting – Island Park Reservoir Enlargement Project

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The Idaho Water Resource Board's Water Storage Committee is scheduled to meet in Rexburg on July 24, 2019. The primary purpose of the meeting is to discuss the status of the Island Park Reservoir Enlargement Project and the results of the *Land and Real Estate Assessment*.

## Background:

- The *Henrys Fork Basin Study* (Basin Study), completed by the US Bureau of Reclamation (Reclamation) in 2014 in partnership with the Idaho Water Resource Board (IWRB), identified an option to increase surface water storage in the basin through an enlargement of the Island Park Reservoir.
- The Basin Study provided a conceptual level analysis of a proposal to increase the operational water surface elevation of the reservoir one to four feet resulting in approximately 30,000 acre-feet of additional storage water. The additional water was intended to be captured and stored in existing reservoir space currently reserved for flood flows under a flowage easement held by Reclamation. The relative construction cost was estimated to be \$6.4 million with limited modifications to the dam and reservoir:
  - Minimal modifications to the existing embankment dam.
  - Modification of the emergency spillway to provide additional discharge capacity to offset current flood surcharge space in the reservoir.
  - Increase in the height of the one-foot bladder on the Operational Spillway.
  - Possible modifications to the dike adjacent to the embankment dam.
- Implementation of the enlargement project would require completion of a feasibility and environmental compliance studies. Given the conceptual level of analysis in the Basin Study, IWRB and Reclamation agreed that a more detailed analysis of potential affects to property resulting from a raise in reservoir pool elevation was necessary to clarify the viability of the project prior to initiation of feasibility studies.
- The IWRB subsequently initiated the Island Park Reservoir Enlargement Land and Real Estate Assessment (Assessment) to evaluate and quantify potential affects to property and infrastructure with the expectation that future action would be considered based upon the results of the Assessment.

## Status:

- Forsgren Associates, Inc. (Forsgren), under contract with the IWRB, performed an analysis of potential affects to land, real estate, roads, utilities, septic systems, easements, shoreline and other appurtenant structures resulting from a one to four-foot raise of the reservoir water surface elevation, and to estimate associated costs.

- The scope of work generally included:
  - 1) Compilation and review of existing data including: 2016 airborne LIDAR and orthoimagery; field survey to validate existing elevation data and clarify critical areas; and generation of a base map to manage all collected and existing data for use as an evaluation and documentation tool.
  - 2) Evaluation of water surface increase alternatives (one to four feet in one-foot intervals). The analysis of each alternative included an inventory of impacts and associated potential costs.
  - 3) Completion of a report documenting collected data and results, development of base map, and presentation of results and technical findings.
- Forsgren coordinated with IDWR/IWRB staff and representatives from Reclamation to define project objectives and methodology, exchange available project area elevation data and easement information, address property access requirements, and review study results.
- Results of the Appraisal will be presented to the IWRB's Water Storage Committee on July 24, 2019.



## Island Park Reservoir Enlargement Project – Land & Real Estate Assessment

IWRB Storage Committee

July 24, 2019

Cynthia Bridge Clark (IDWR)



## Why Investigate New Water Storage?

“Water use conflicts, continued unprecedented drought, population growth and urban development, conjunctive administration, Endangered Species Act requirements and other additional demands are being placed on the already scarce water resources of the state” (House Joint Memorial No. 8, 2008 Legislature)

Legislative Direction - Idaho Legislature has passed several pieces of legislation directing the IWRB to investigate additional water storage projects across the state, including the enlargement of Island Park Reservoir

- House Joint Memorial No. 8
- Senate Bill 1511
- House Bill 479

State Water Plan - Surface Water Development will continue to play an important role in meeting Idaho’s future water needs.

- Policy 1L Surface Water Supply Enhancement
- Policy 4E Snake River Basin New Storage



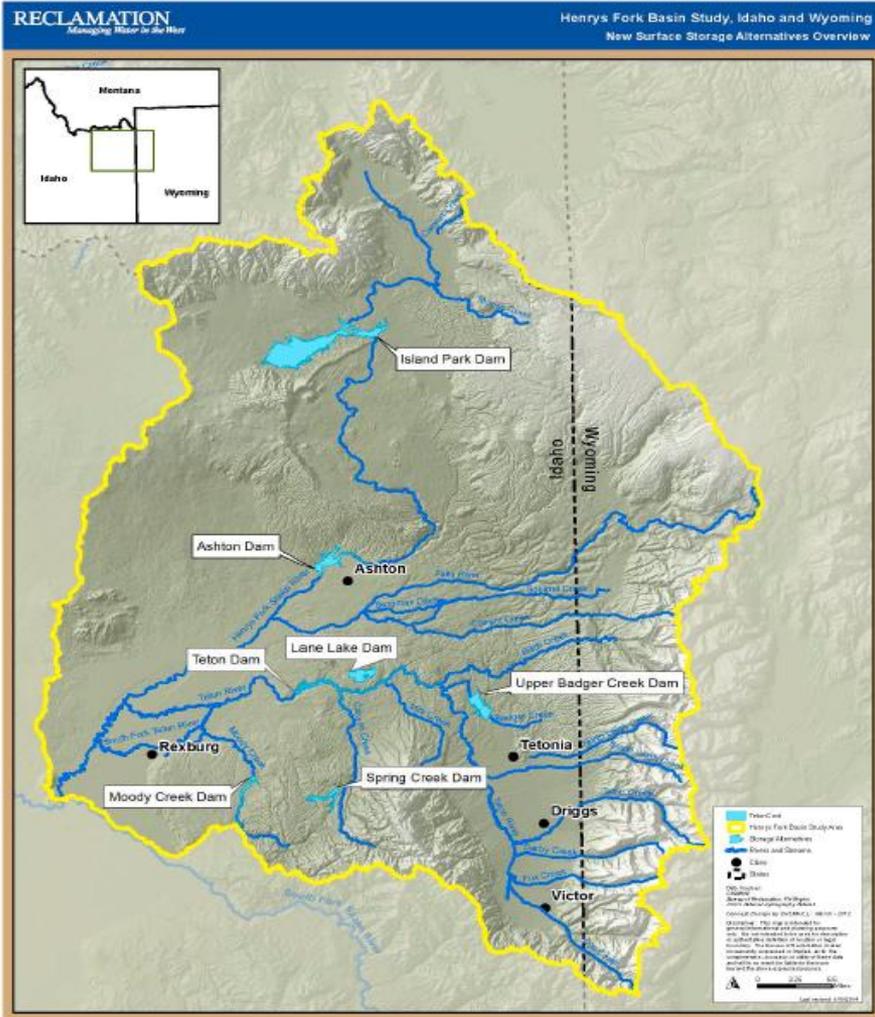
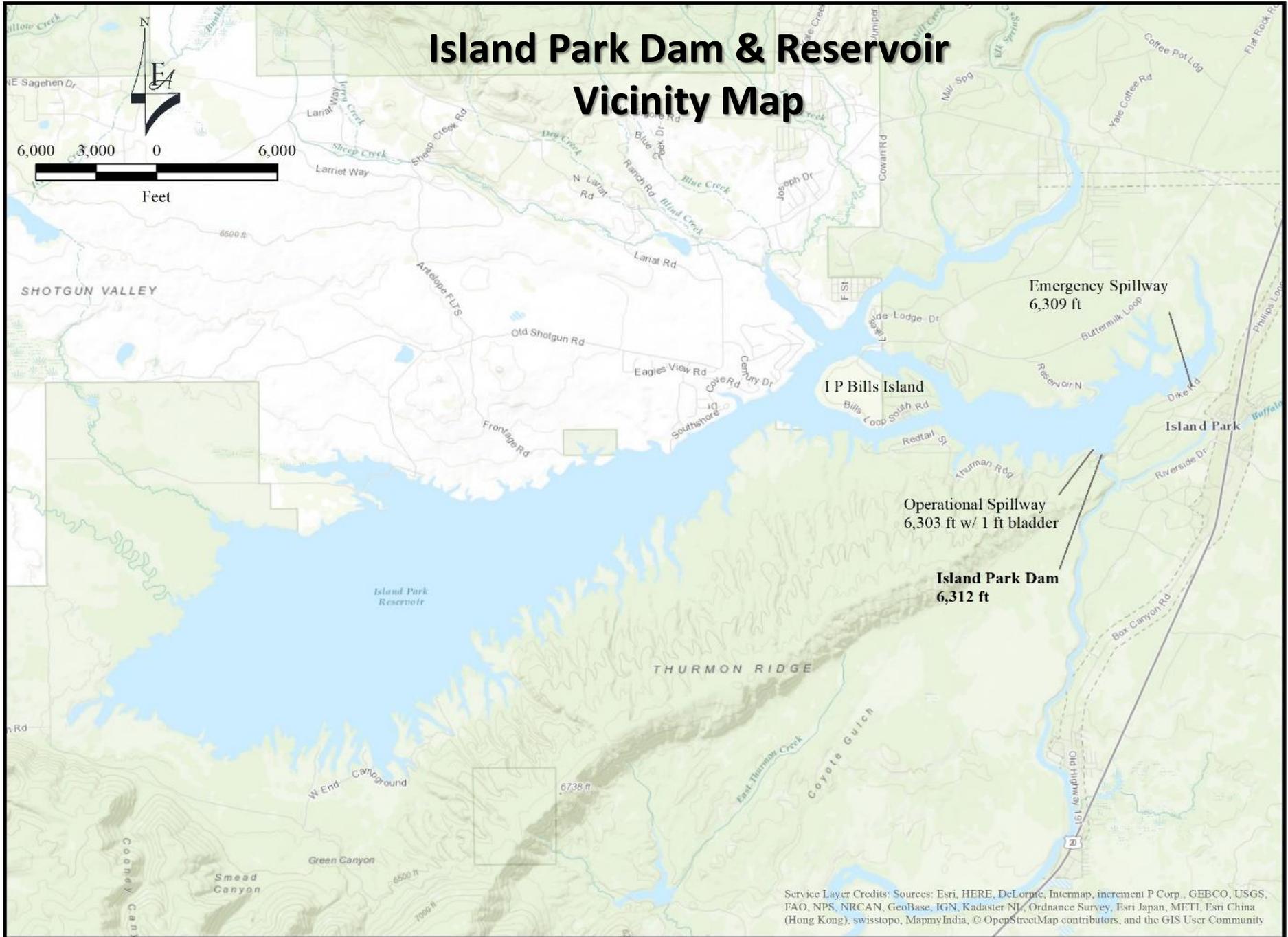
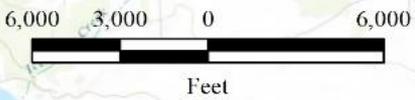


Figure 16. Map of the Henrys Fork River basin and the proposed locations of the seven surface storage alternatives.

## Henrys Fork Basin Study

- Partnership between Reclamation & IWRB – purpose to evaluate water management and supply options for the Henry’s Fork Basin and the Eastern Snake Plain
- Identified 51 alternatives which were reduced to 11 alternatives for further evaluation (managed recharge, water conservation, and surface water storage)
- The study provided the information necessary to prioritize projects based on costs, and physical, social and environmental characteristics.
- IWRB committed to continue to pursue existing programs and coordinate/support projects driven by stakeholder interest.
- **Island Park Reservoir Enlargement concept identified as most promising near-term option for new surface water storage**

# Island Park Dam & Reservoir Vicinity Map



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapnyIndia, © OpenStreetMap contributors, and the GIS User Community

# Island Park Dam & Reservoir Existing Facility

Emergency Spillway

8000' Dike

Operational Spillway

Island Park Dam

Powerhouse

Main Dam

## Existing Facility

- Dam: zoned earthen embankment constructed between 1935 and 1938
- Top of Dam Elevation: 6,312 feet (raised 3 feet in 1985)
- Structural/Hydraulic Height: 94 ft / 75 ft
- Length of Crest: 1,607-foot-long crest and 7,950-foot-long dike
- Owned by Bureau of Reclamation; operated by FMID



## Existing Facility

### Existing Reservoir

- Full Pool Elevation: 6,303 feet w/ 1 ft inflatable bladder (otherwise 6,302 ft)
- Full Pool Capacity: 135,205 acre-feet
- Flood Surcharge: 6,306.6 feet elevation (approx. 29,610 acre-feet)
- Maximum Reservoir Surface Area: approx. 8,000 acres

### Existing Spillways/Outlet

- Outlet Tunnel: low-level intake at bottom of reservoir through base of dam; 3,400 cfs capacity
- Operational Spillway: 6,303 feet (top of concrete weir and bladder); uncontrolled overflow “bathtub spillway”
- Emergency Spillway: 6,309 feet elevation along dike



## Existing Facility

### Hydropower

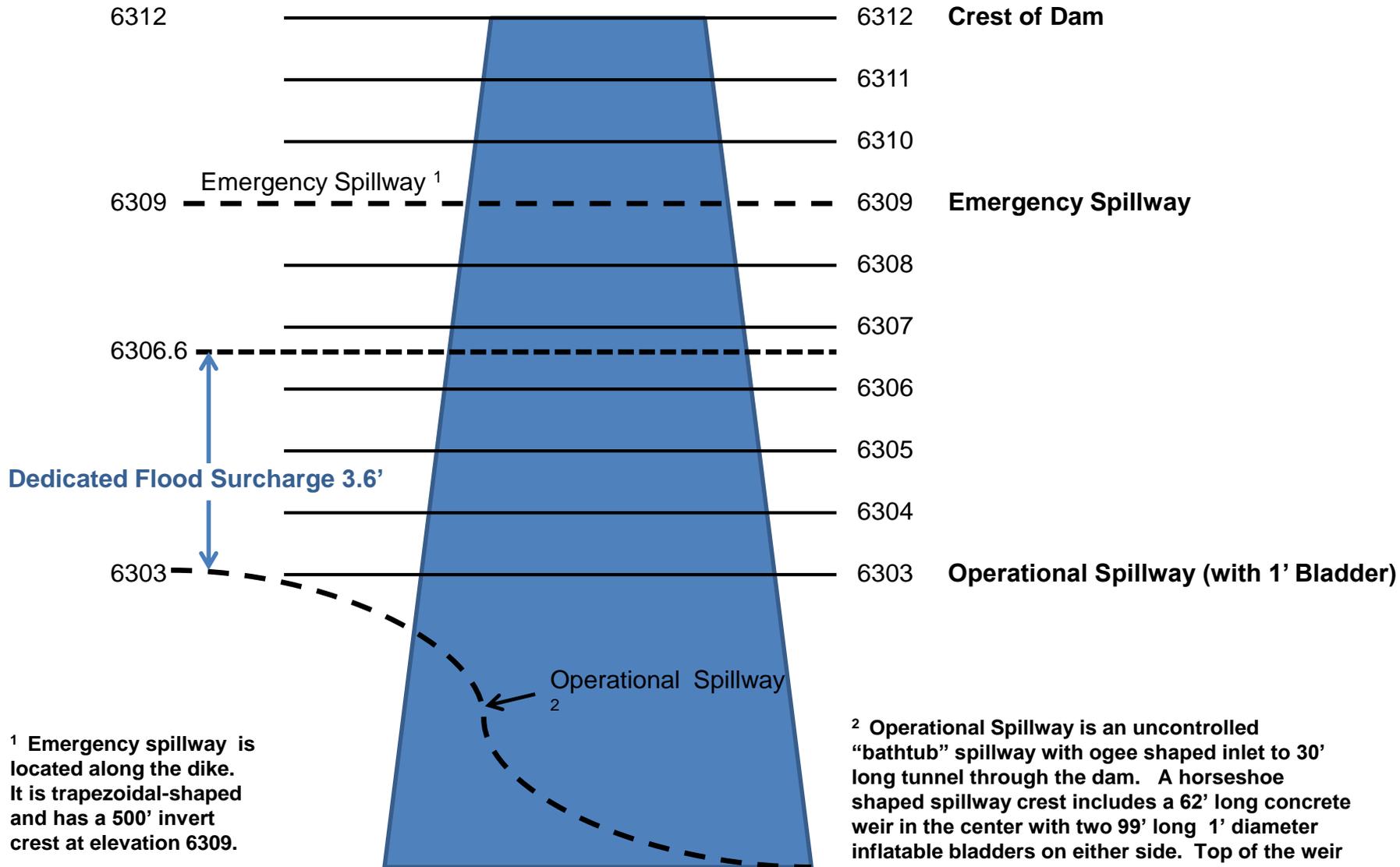
- Existing plant added in 1994  
– 20,000 megawatts per year
- Owned and operated by Fall River Rural Electric Cooperative
- Water piped through 720 ft penstock to powerhouse
- Tailrace includes aeration basin
- 1 ft adjustable rubber collar constructed on overflow spillway to maximize power generation



## Reservoir Enlargement Concept

- Reclamation holds “flowage or flood easements” up to approximately elevation 6306.6
- Concept proposed in the Basin Study: convert existing flood surcharge space to additional water storage capacity by increasing the normal operating water surface elevation up to 4 feet (normal operating pool 6303 ft; increased full pool elevation approx 6307 ft)
- Additional pool capacity: 26,700 – 35,000 acre-feet per Basin Study
- Limited Potential Modifications:
  - Assume limited change to dam embankment (verification required)
  - Increase height of bladder on Operational Spillway
  - Potential modification of Emergency Spillway to provide additional discharge capacity and offset current flood storage space in reservoir
  - Additional modifications to dike may be required
- Cost Estimate as per Basin Study (4 ft Enlargement)
  - 4-foot enlargement = \$240 per acre-foot
  - Total Relative Construction Cost: \$6,400,000

**HENRYS FORK BASIN STUDY - ISLAND PARK DAM  
EXISTING CONFIGURATION SCHEMATIC**  
(not to scale)



<sup>1</sup> Emergency spillway is located along the dike. It is trapezoidal-shaped and has a 500' invert crest at elevation 6309.

<sup>2</sup> Operational Spillway is an uncontrolled "bathtub" spillway with ogee shaped inlet to 30' long tunnel through the dam. A horseshoe shaped spillway crest includes a 62' long concrete weir in the center with two 99' long 1' diameter inflatable bladders on either side. Top of the weir and bladders elevation is 6303 ft.

## Land & Real Estate Assessment

- Limited analysis of effects to property and infrastructure performed in Basin Study (limited available elevation data)
- Evaluate and quantify effects to land, real estate, roads, utilities, septic systems, easements, shoreline and other appurtenant structures resulting from a 1 to 4-foot raise of the reservoir water surface elevation
- Results intended to help determine how and whether to proceed with the enlargement of the Island Park Reservoir



# Land & Real Estate Assessment Results



# Island Park Reservoir Enlargement Project

Land and Real Estate Assessment  
Project Report  
July 24, 2019

# Project Scope Overview

## 1. Data Collection, Evaluation and Review

- Pre-project topography & imagery          Public records

## 2. Base Mapping, Field Reconnaissance

- GIS map                                  Survey                                  Refinement

## 3. Water Surface Rise Simulations

- Analysis method                          Effects map and catalog

## 4. Land Assessment Report

- Count & valuation                                  Decision tool



# Analysis Elements

- Residences
  - Potential wetted structures
  - Potential residential protection
  - Potential wetted basements
- Property
  - Potential wetted outbuildings
  - Potential wetted developed property
  - Potential wetted undeveloped property
- Septic Effects
  - Horizontal setback requirement (200-foot)
  - Vertical separation requirement (GW elevation + minimum separation)

# Analysis Guiding Principles

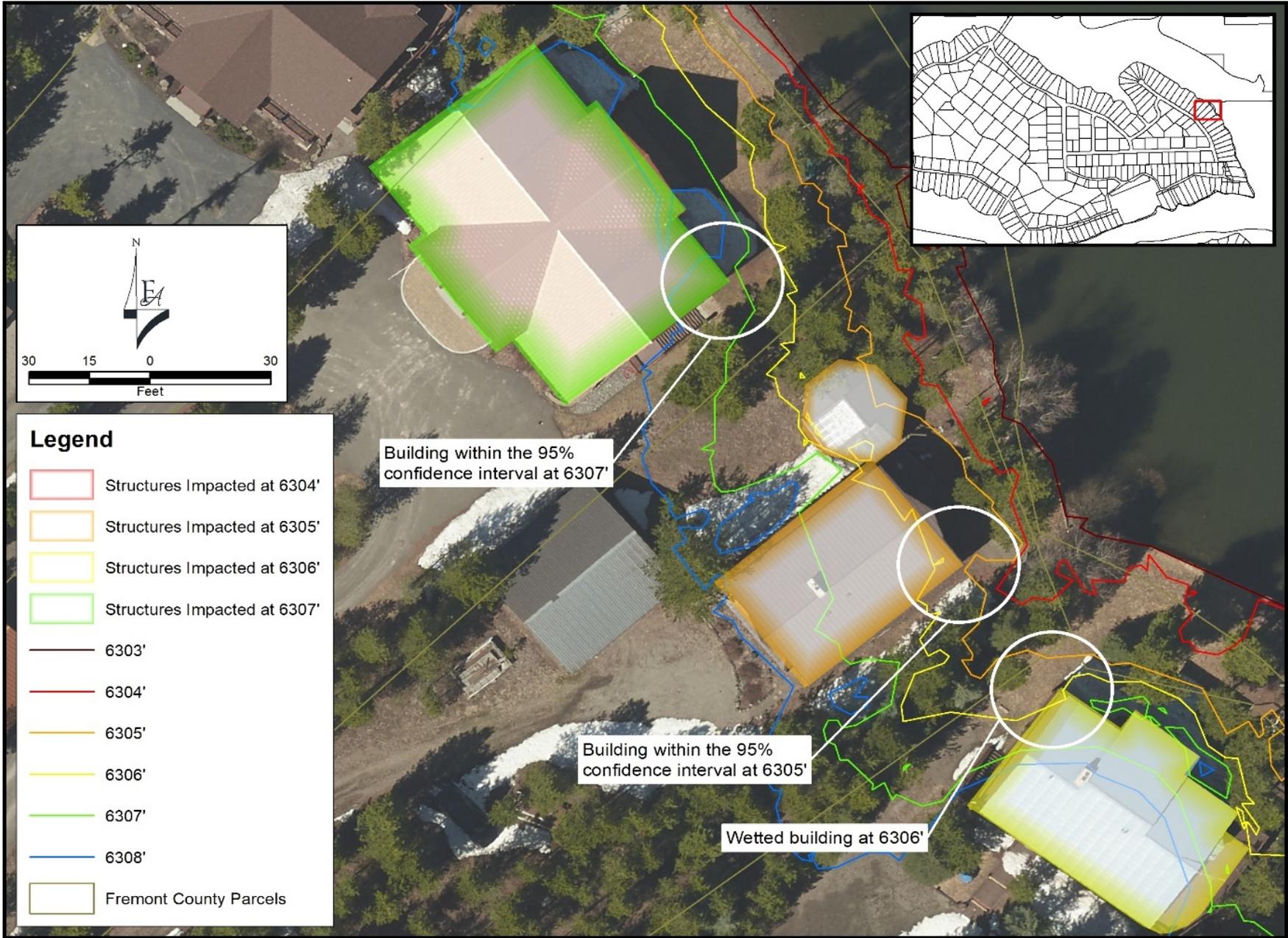
## 1. Decision Support Tool

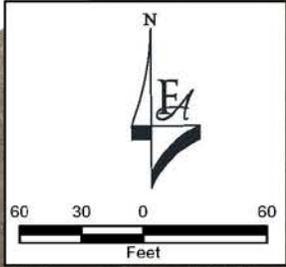
- Counts
- Valuation
- Trends

## 2. Individual Lot Based Analysis

- Potential for scrutiny on lot by lot basis
- Documentable GIS elements describing effects

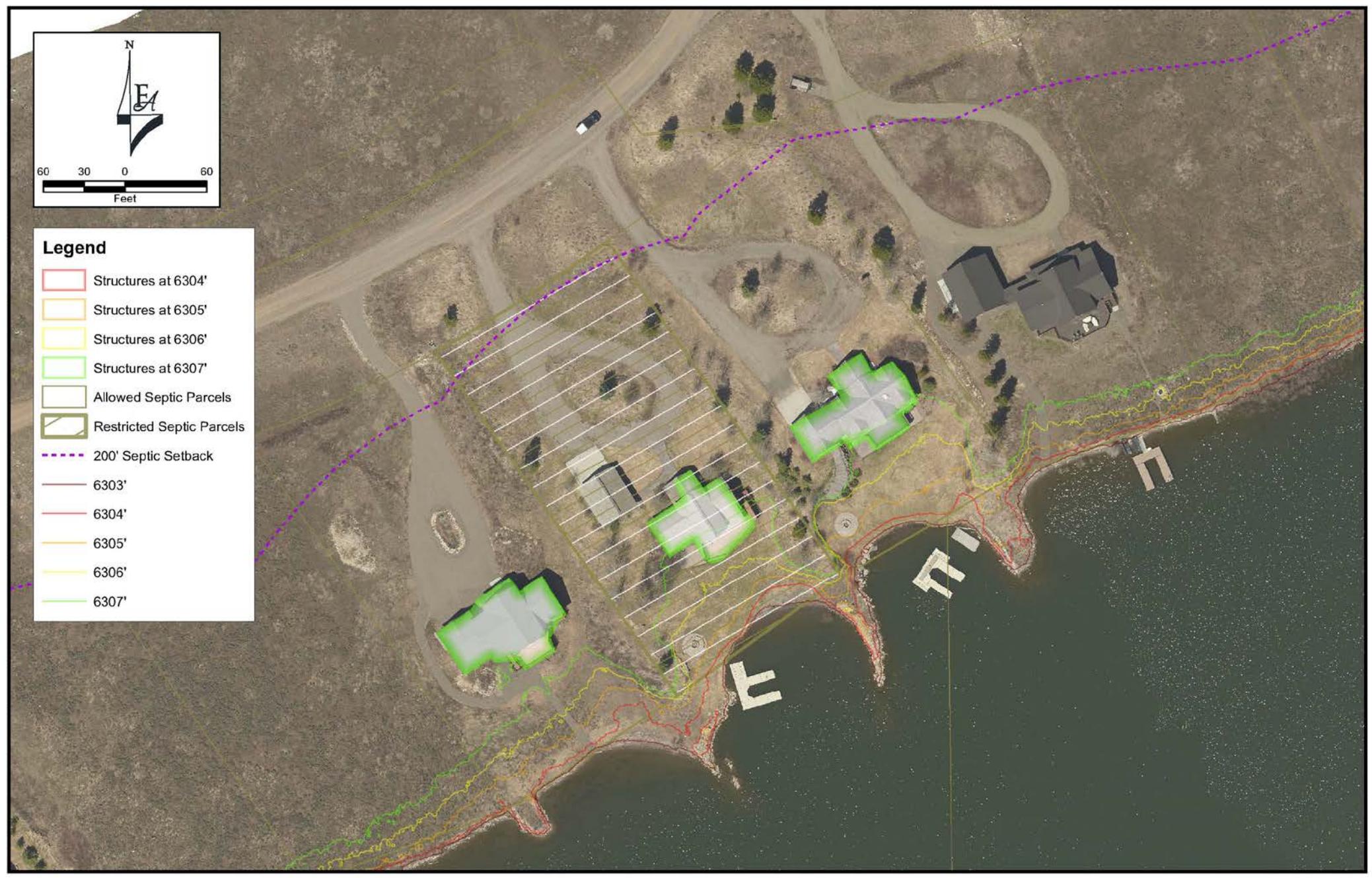
## 3. Effects categorized at 1-foot contour intervals from 6303 to 6307

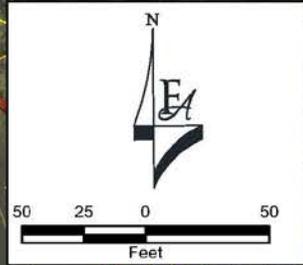




**Legend**

- Structures at 6304'
- Structures at 6305'
- Structures at 6306'
- Structures at 6307'
- Allowed Septic Parcels
- Restricted Septic Parcels
- 200' Septic Setback
- 6303'
- 6304'
- 6305'
- 6306'
- 6307'





**Legend**

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# Decision Matrix Development

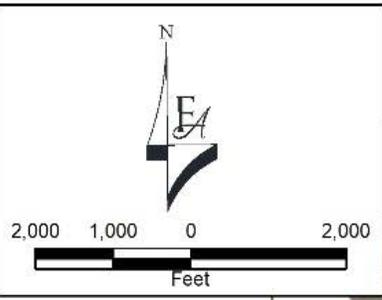
- Document and summarize effects data by parcel
- Collate aggregate parcel effects data by contour
- Develop valuation for affected elements
- Develop matrix of estimated effect value by parcel and contour

# Simulation Results

Parameter	Counts by Proposed Elevation (feet)				
	6303	6304	6305	6306	6307
Total wetted residential structures (ea.)	0	3	18	55	84
Total wetted basements (ea.)	4	6	6	8	9
Total potential residential protection (ea.)	32	52	64	64	64
Total estimated wetted outbuilding (ea.)	0	4	8	10	17
Total restricted septic parcels (ea.)	58	71	79	93	134
Total affected parcels (ea.)	87	123	153	190	232
Total wetted property area (acre)	0	119	179	254	360

Parameter	Volume & Valuation for each Evaluated Elevation (feet)			
	6304	6305	6306	6307
Additional Storage (AF)	8,253	16,808	25,654	34,796
Estimated Real Estate Effect Value (\$M)	\$9.3	\$22.2	\$48.0	\$71.9

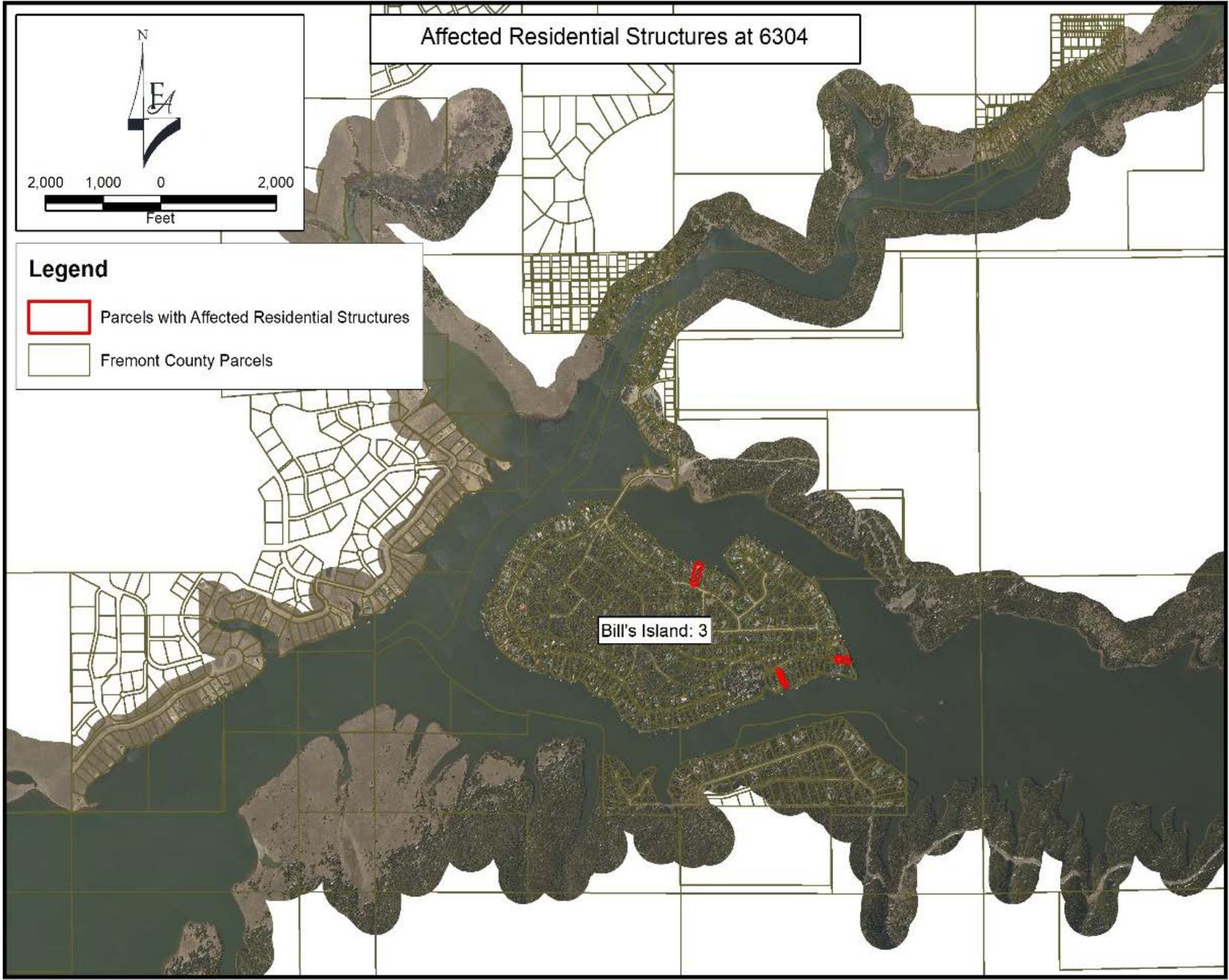
# Affected Residential Structures at 6304



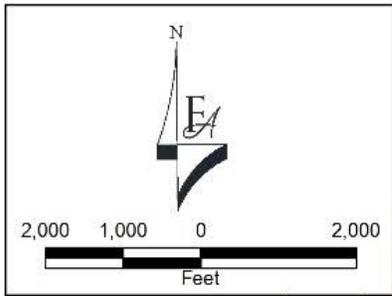
## Legend

-  Parcels with Affected Residential Structures
-  Fremont County Parcels

Bill's Island: 3



# Affected Residential Structures at 6305



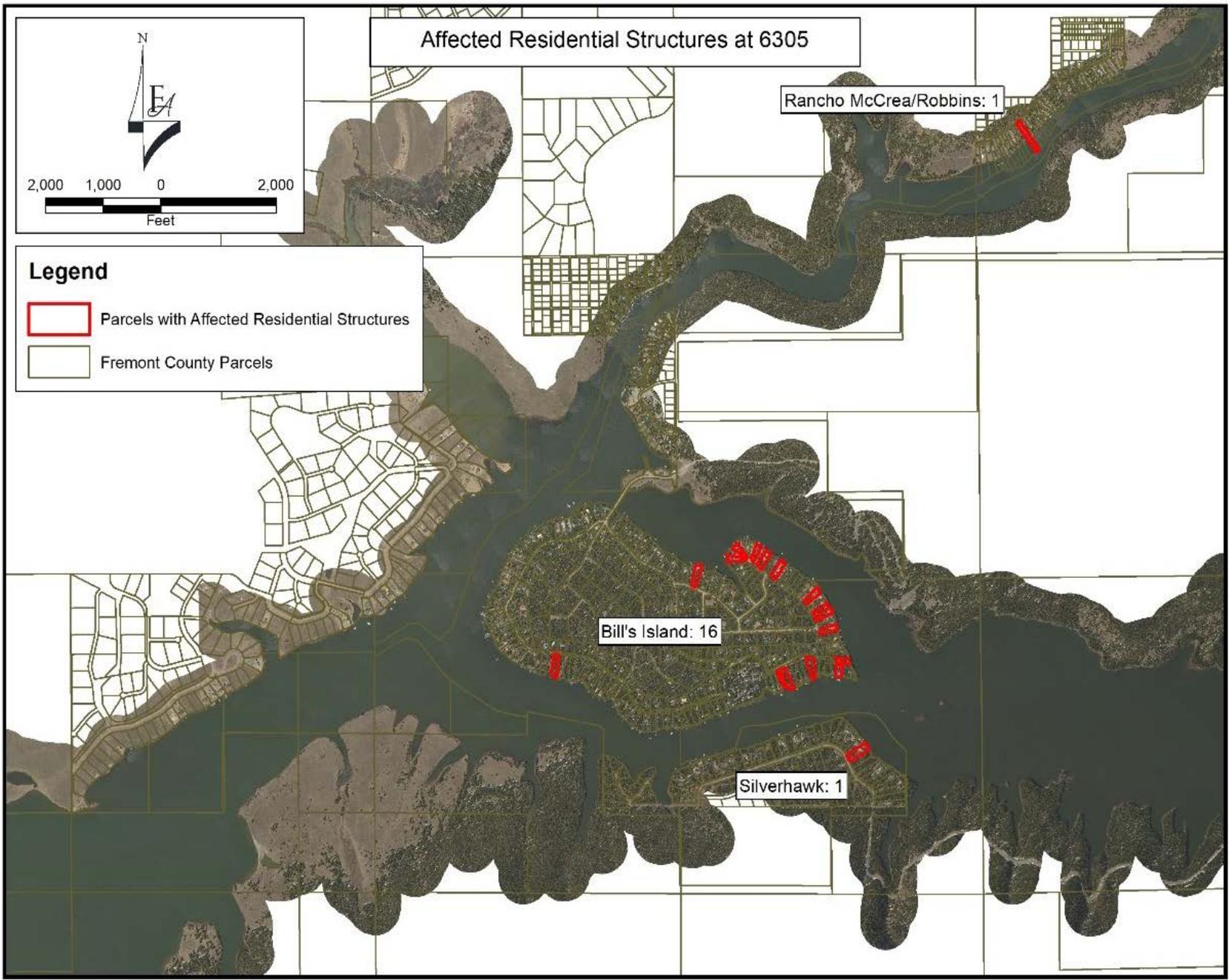
**Legend**

-  Parcels with Affected Residential Structures
-  Fremont County Parcels

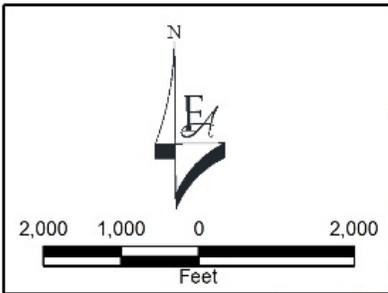
Rancho McCrea/Robbins: 1

Bill's Island: 16

Silverhawk: 1



# Affected Residential Structures at 6306



**Legend**

-  Parcels with Affected Residential Structures
-  Fremont County Parcels

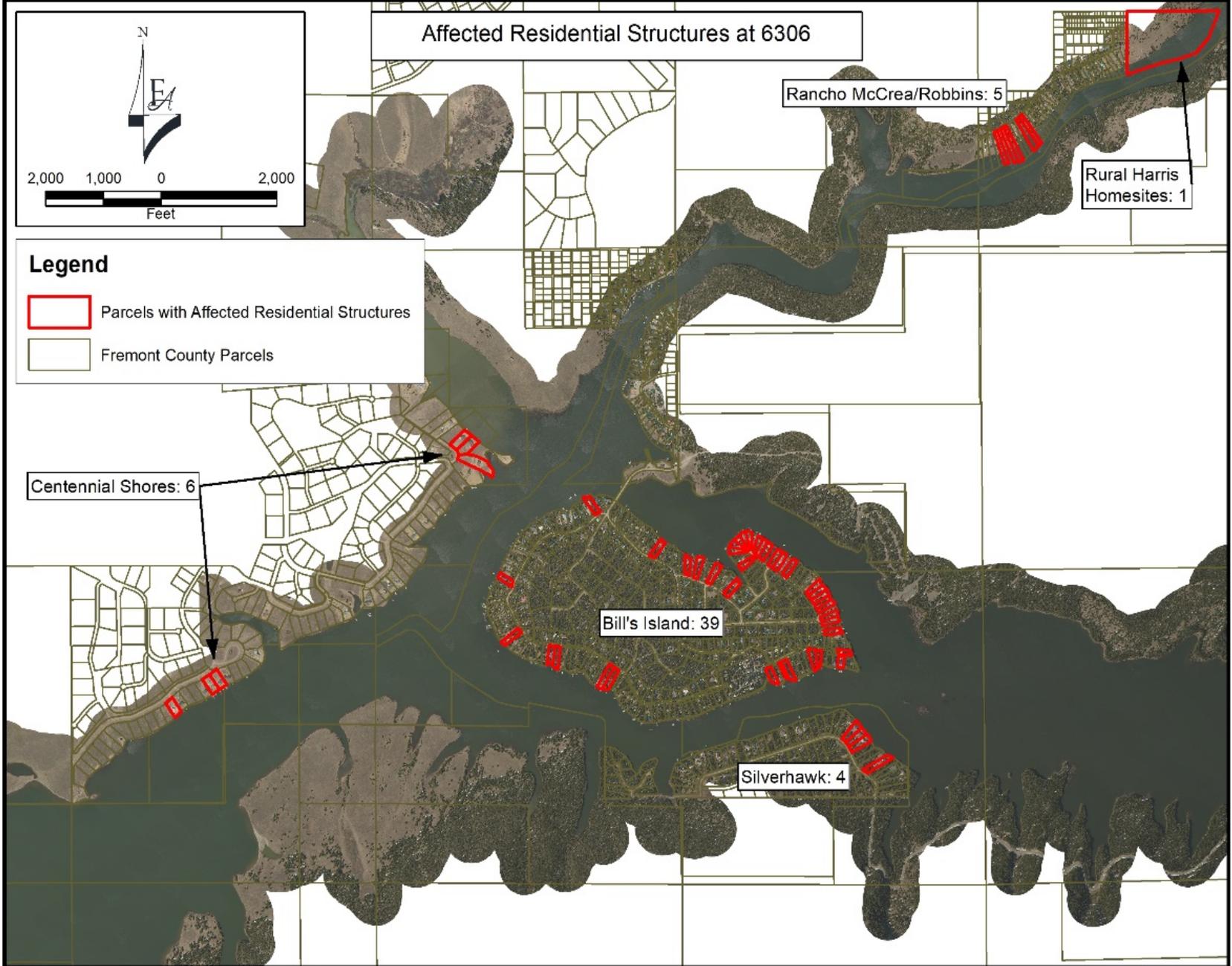
Rancho McCrea/Robbins: 5

Rural Harris Homesites: 1

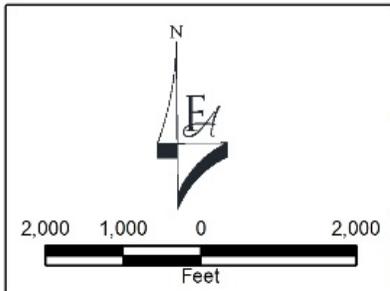
Centennial Shores: 6

Bill's Island: 39

Silverhawk: 4



# Affected Residential Structures at 6307



**Legend**

-  Parcels with Affected Residential Structures
-  Fremont County Parcels

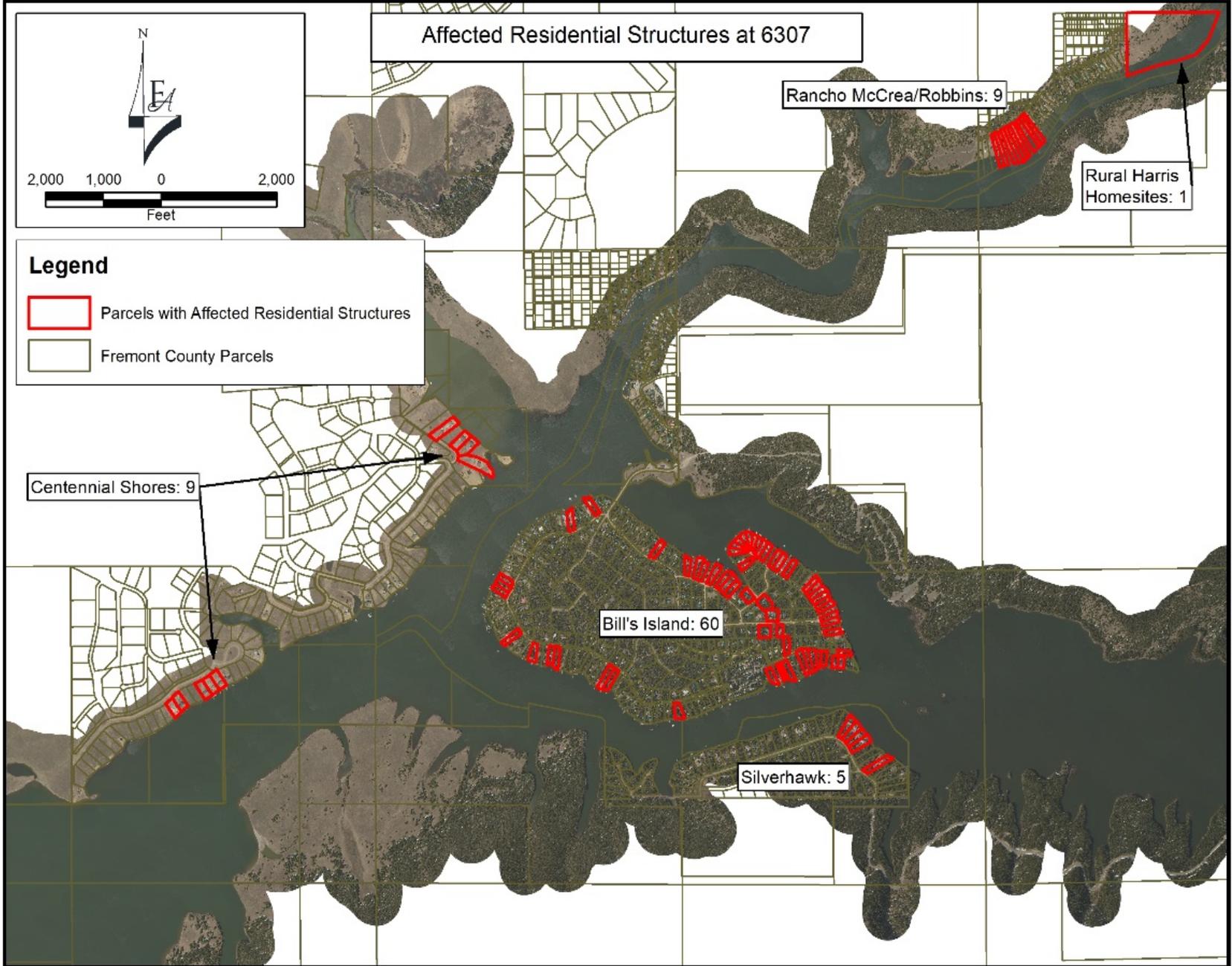
Rancho McCrea/Robbins: 9

Rural Harris Homesites: 1

Centennial Shores: 9

Bill's Island: 60

Silverhawk: 5



# Conclusions

- Optimal target full pool elevation 6305
  - Elevation 6304 may not justify a project
  - Elevation 6305 could increase total storage 12% and low-end storage 80%
  - Elevation 6305 / 6306 breakpoint
  - Elevation 6305 maximum for some flowage easements
- Bureau of Reclamation flowage easement definition, understanding, and administration
- Other potential project benefits
  - Recreation access and navigation improvements
  - Reservoir and downstream water quality management

# Next Steps

- Land Assessment Refinement
  - On site survey extent of inundation, structures and features, property boundaries
  - Refined septic system assessment
  - Verification of groundwater levels
  - Geotechnical investigation
- Further definition of Bureau of Reclamation flowage easements is recommended
- Bureau of Reclamation feasibility and environmental compliance studies
  - Basin hydrology, water use / rights, flood routing
  - Reservoir and system operations
  - Structural modifications
  - Environmental evaluation
  - Public and stakeholder involvement

# Questions / Discussion