AN EXERCISE IN FINDING VIABLE REMEDIAL ALTERNATIVES

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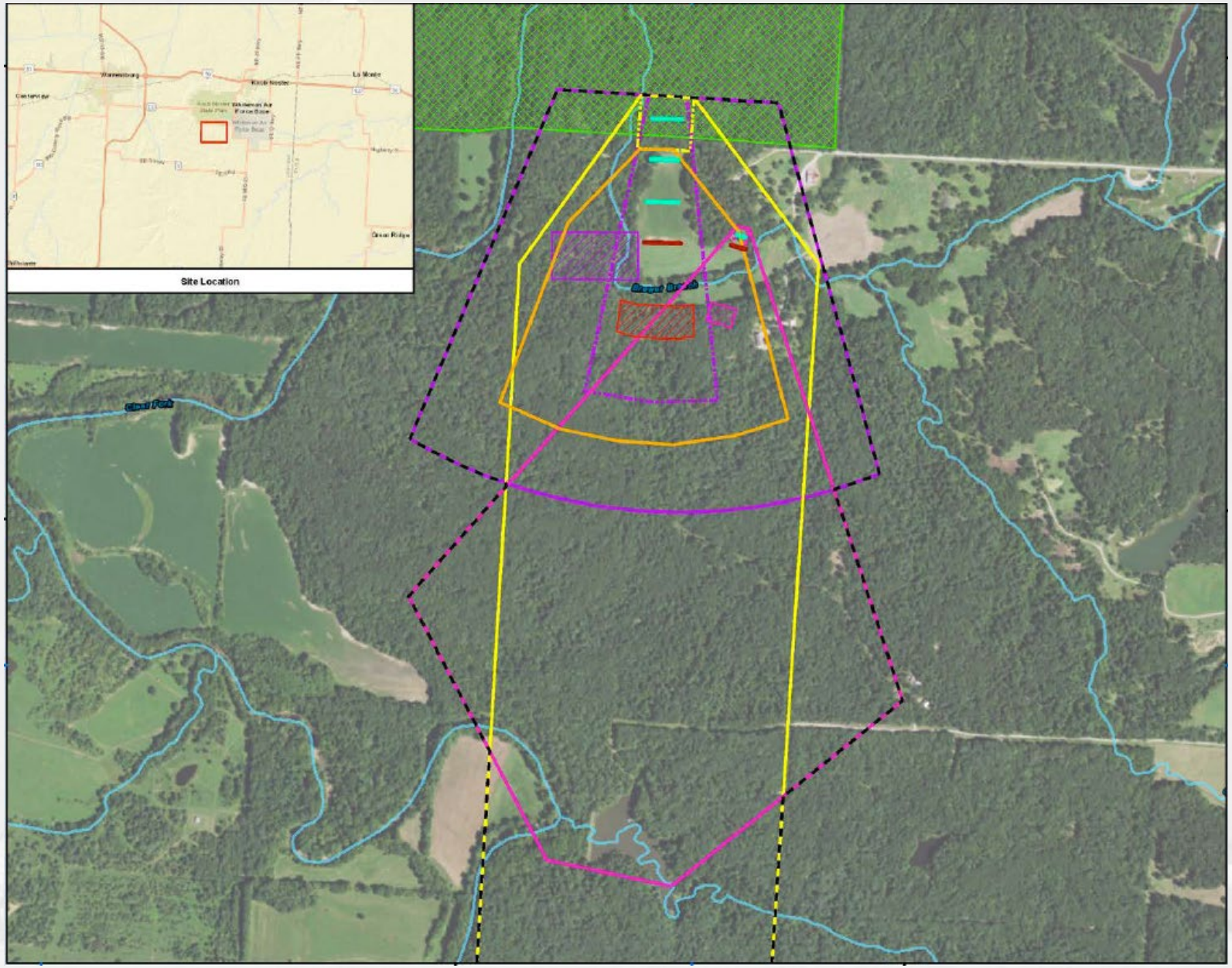
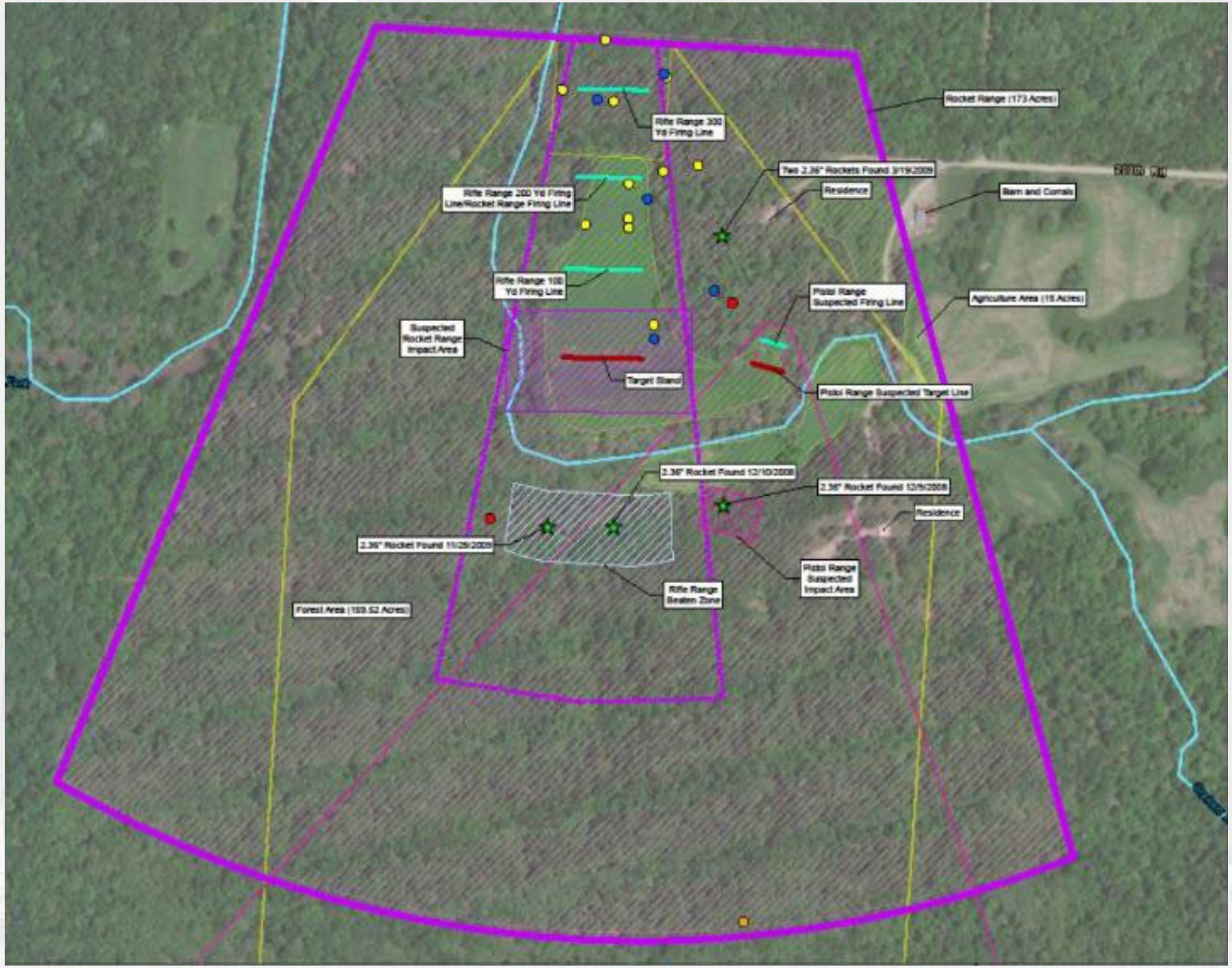
SEDALIA AAF RIFLE RANGE MRS



SEDALIA AAF RIFLE RANGE MRS FEATURES



2019 REMEDIAL INVESTIGATION CONCLUSIONS

- Concentrated Munitions Use Area defined as 173-acre Rocket Range Safety Fan
- MEC suspected are 2.36-inch HEAT rockets and Mk II grenades
- MEC suspected to be on the ground surface or up to five inches below ground surface

- MEC presents an unacceptable risk to human receptors scenarios
  - Recreational user
  - Resident
  - Site worker
  - Construction workers
  - Agriculture worker

2019-2022 FEASIBILITY STUDY

The RAO at the Sedalia AAF is to reduce risk due to the presence of Mk II grenades and 2.36-in HEAT rockets within the 173-acre MRS to a depth of land use to prevent worker, recreational user, and property owner interaction with MEC while conducting intrusive activities to a depth of 2 feet below ground surface such that acceptable risk conditions are achieved.

Alternative 1 - No Action

Alternative 2 – Land Use Controls

Alternative 3 – Surface MEC Removal and Land Use Controls

Alternative 4 - Surface and Subsurface MEC Removal and LUCs

Alternative 5 – Surface and Subsurface MEC Removal to Support Unlimited Use and Unrestricted Exposure

SEDALIA AAF RIFLE RANGE LAND USE

A: Trail in Park

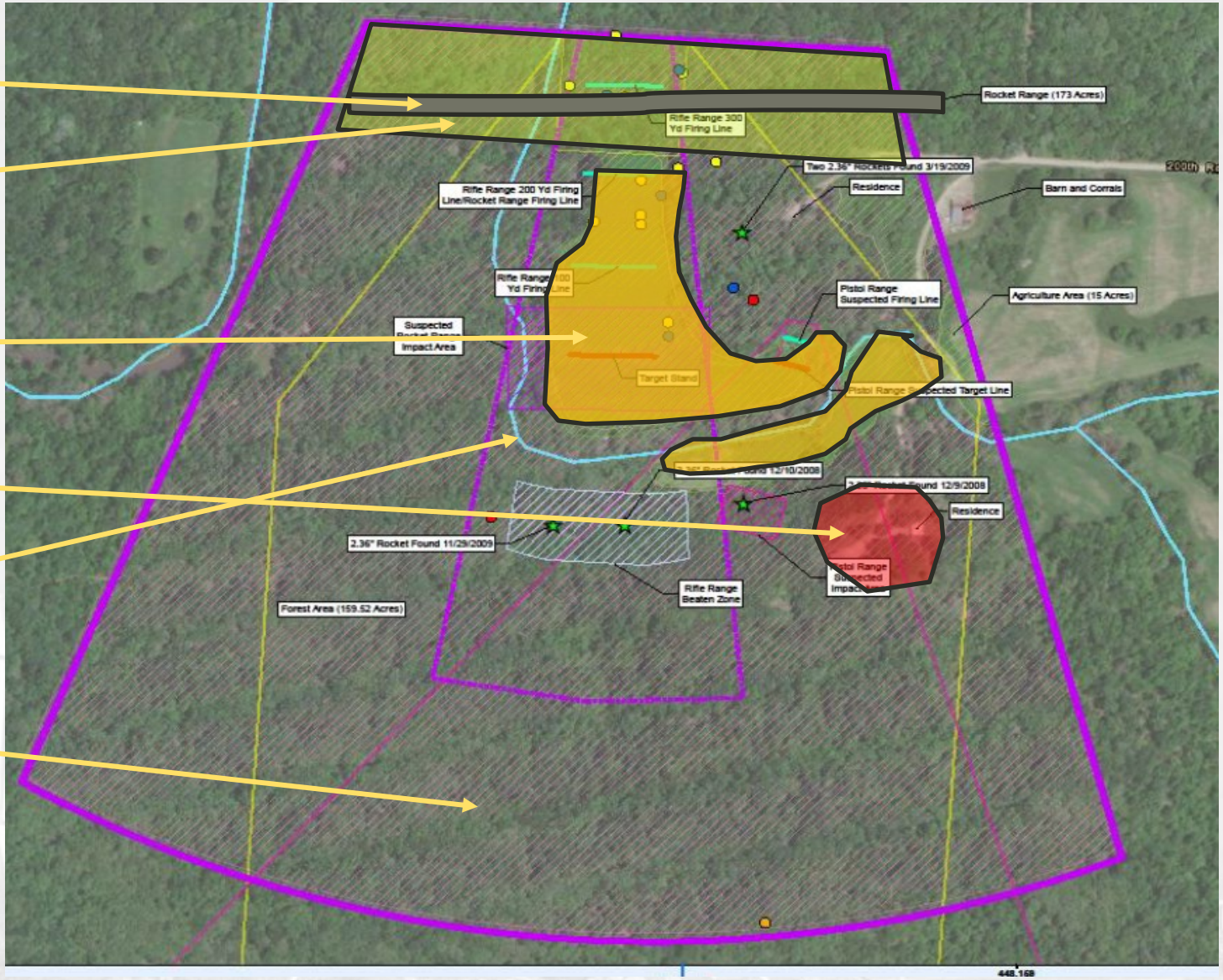
B: Forest in Park

C: Agricultural/ Open areas

D: Residential area and pond

E: Creek

F: Forested Area



Note that the RI does not identify HUA/LUA; the entire area is considered contaminated with unacceptable risk

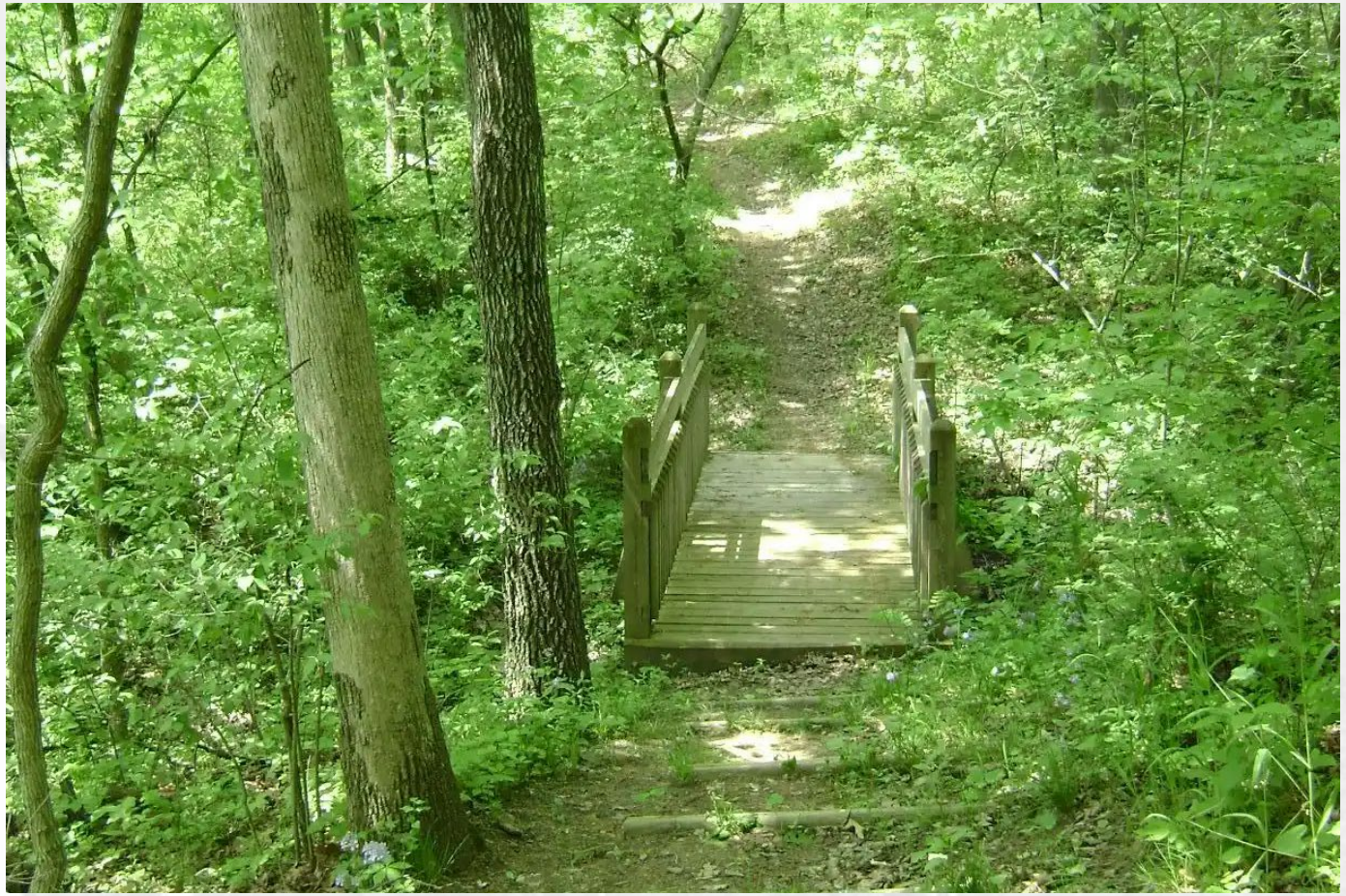
TECHNOLOGY PROCESS OPTIONS

Assessment Area	Options				
A: Trail (with buffer)	1. Remove all trees, AGC subsurface removal	2. Remove trees <3 in, AGC subsurface removal, LUCs	3. Clear MEC around trees, AGC subsurface removal, LUCs	4. Construct boardwalk with railing, surface clearance, LUCs	
B: Forest, in park	1. Remove all trees, AGC subsurface removal	2. Remove trees <3 in, AGC subsurface removal, LUCs	3. Surface removal, LUCs	4. Construct railing along trail, prohibit off-trail activities	
C: Agricultural (open) areas	1. AGC subsurface removal	2: Dig and sift			
D: Residential Area and Pond	1. AGC subsurface removal, LUCs fences and underground utilities	2. Surface clearance with LUCs (information and annual inspections)			
E: Creek	1. DGM (AGC or non-AGC) subsurface with analog where handheld DGM is not feasible, LUCs	2. Surface removal with LUCs (information and annual inspections)	3. DGM (AGC or non-AGC) subsurface with MPV, LUCs	4. DGM (AGC or non-AGC), dig and sift steep banks	
F: HD Forest, private property	1. Remove trees <3 in, conduct AGC on transects to define HUA/LUA, surface removal in LUA, subsurface removal in HUA, LUCs	2. Remove trees <3 in, conduct 100% AGC to define HUA/LUA, subsurface removal in HUA, LUCs	3. Remove trees <3 in and >3 in as necessary to resolve anomalies, conduct 100% AGC to define HUA/LUA, subsurface removal in HUA	4. Remove trees <3 in, AGC subsurface removal except inaccessible area and trees with anomalies, LUCs	5. Remove trees <3 in and >3 in as necessary to resolve anomalies, AGC subsurface removal

A: STATE PARK TRAIL ASSESSMENT AREA

Process Options

1. Remove all trees, AGC subsurface removal
2. Remove trees <3 in, AGC subsurface removal, LUCs
3. Subsurface removal using ACG around trees, LUCs
4. Construct boardwalk with railing, surface removal, LUCs



A: STATE PARK TRAIL ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. Remove all trees, AGC subsurface removal	Yes	Difficult	High	No
2. Remove trees < 3-inch diameter, AGC subsurface removal, LUCs	Yes	Moderate	Moderate	Yes
3. AGC subsurface removal around trees, LUCs	Yes	Moderate	High	No
4. Construct boardwalk with railing, surface clearance, LUCs	Yes	Simple	Low	Yes

B: FOREST, IN PARK ASSESSMENT AREA

Process Options

1. Remove all trees, subsurface removal using AGC
2. Remove trees <3 in, subsurface removal using AGC, LUCs
3. Surface removal, LUCs
4. Construct railing along trail, prohibit off-trail activities

B: FOREST, IN PARK ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. Remove all trees, AGC subsurface removal	Yes	Difficult	High	No
2. Remove trees < 3-inch diameter, AGC subsurface removal, LUCs	Yes	Moderate	Moderate	Yes
3. Surface removal, LUCs	No	Simple	Low	No
4. Construct railing along trail, surface clearance, prohibit off-trail activities	Yes	Moderate	Low	Yes

C: AGRICULTURAL ASSESSMENT AREA

Process Options

1. AGC subsurface removal
2. Dig and sift

C: AGRICULTURAL ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. AGC subsurface removal	Yes	Simple	Low	Yes
2. Dig and sift	Yes	Difficult	High	No

D: RESIDENTIAL AND POND ASSESSMENT AREA

Process Options

1. AGC subsurface removal, LUCs fences and underground utilities
2. Surface clearance with LUCs (information and annual inspections)

D: RESIDENTIAL AND POND ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. AGC subsurface removal, LUCs fences and underground utilities	Yes	Difficult	High	Yes
2. Surface clearance with LUCs (information and annual inspections)	No	Simple	Low	No

E: CREEK ASSESSMENT AREA

Process Options

1. DGM (AGC or non-AGC) subsurface with analog where handheld DGM is not feasible, LUCs
2. Surface removal with LUCs (information and annual inspections)
3. DGM (AGC or non-AGC) subsurface with MPV, LUCs
4. DGM (AGC or non-AGC), dig and sift steep banks

E: CREEK ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. DGM (AGC or non-AGC) subsurface with analog where handheld DGM is not feasible, LUCs	Yes	Difficult	Moderate	Yes
2. Surface removal with LUCs (information and annual inspections)	No	Simple	Low	No
3. DGM (AGC or non-AGC) subsurface with MPV, LUCs	Yes	Moderate	Moderate	Yes
4. DGM (AGC or non-AGC), dig and sift steep banks	Yes	Difficult	High	No

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F: FOREST, PRIVATE LAND ASSESSMENT AREA

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F: FOREST, PRIVATE LAND ASSESSMENT AREA

Process Option	Effectiveness	Implementability	Cost	Retained?
1. Remove trees <3 in, conduct AGC on transects to define HUA/LUA, surface removal in LUA, subsurface removal in HUA, LUCs	Yes	Moderate	Low	Yes
2. Remove trees <3 in, conduct 100% AGC to define HUA/LUA, subsurface removal in HUA, LUCs	Yes	Moderate	Moderate	No
3. Remove trees <3 in and >3 in as necessary to resolve anomalies, conduct 100% AGC to define HUA/LUA, subsurface removal in HUA	Yes	Simple	High	Yes
4. Remove trees <3 in, AGC subsurface removal except inaccessible area and trees with anomalies, LUCs	Yes	Difficult	High	No
5. Remove trees <3 in and >3 in as necessary to resolve anomalies, AGC subsurface removal	Yes	Difficult	High	Yes

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REMEDIAL ALTERNATIVES

Assessment Area	Alternative 1	Alternative 2	Alternative 3
A: Trail (with buffer)	2. Remove trees < 3-inch diameter, AGC subsurface removal, LUCs	4. Construct boardwalk with railing, surface clearance, LUCs	4. Construct boardwalk with railing, surface clearance, LUCs
B: Forest, in park	2. Remove trees < 3-inch diameter, AGC subsurface removal, LUCs	4. Construct railing along trail, surface clearance, prohibit off-trail activities	2. Remove trees < 3-inch diameter, AGC subsurface removal, LUCs
C: Agricultural (open) areas	1. AGC subsurface removal	1. AGC subsurface removal	1. AGC subsurface removal
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E: Creek	1. DGM (AGC or non-AGC) subsurface with analog where handheld DGM is not feasible, LUCs	3. DGM (AGC or non-AGC) subsurface with MPV, LUCs	1. DGM (AGC or non-AGC) subsurface with analog where handheld DGM is not feasible, LUCs
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QUESTIONS?

Lessons Learned

- Develop effective remedial process options for each assessment area within an MRS
- Conduct general response action screening for each assessment area within an MRS
- Land use controls cannot require land users to change how they use their land
- Some process options may achieve UU/UE but not necessarily entire alternatives

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