Analysis Framework

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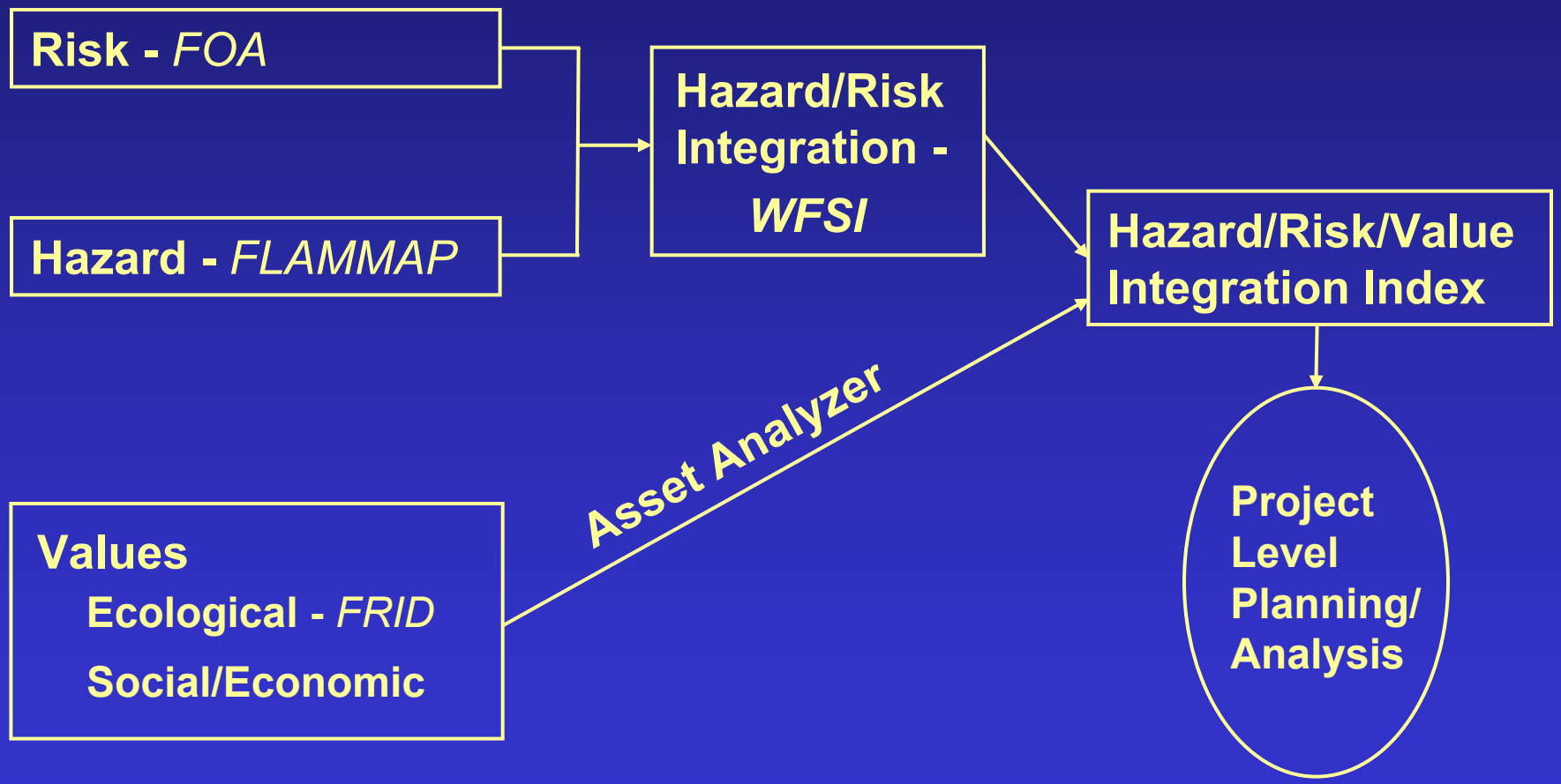
SSGIC Program Manager

SSGIC Analysis Framework



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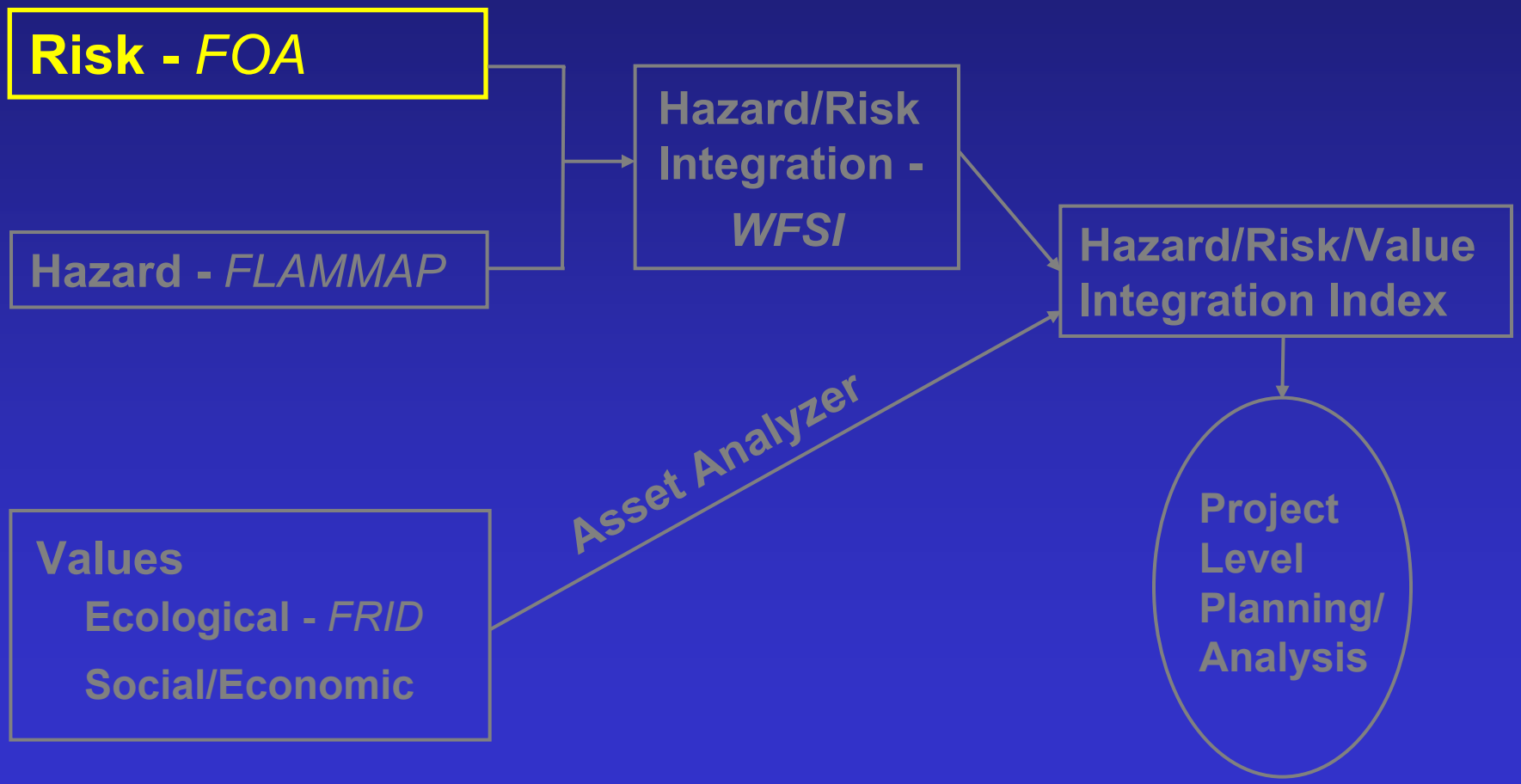


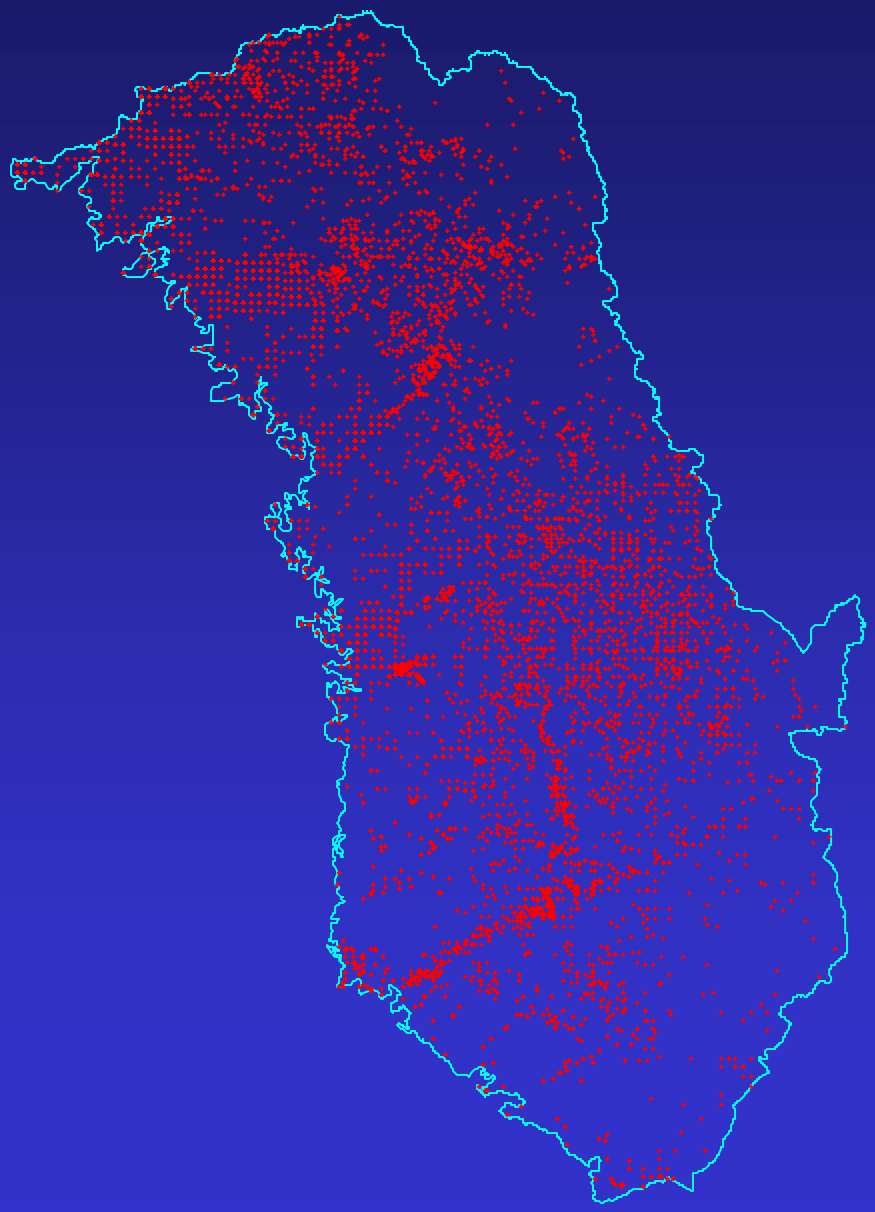
FOA

Fire Occurrence Areas

Goal: Distribute ignition point data across the landscape to identify areas with similar probabilities of ignitions.

Source Data: 1981 - 2000 Ignition Data - 8000+ fire starts.

Ignition Point Source Data

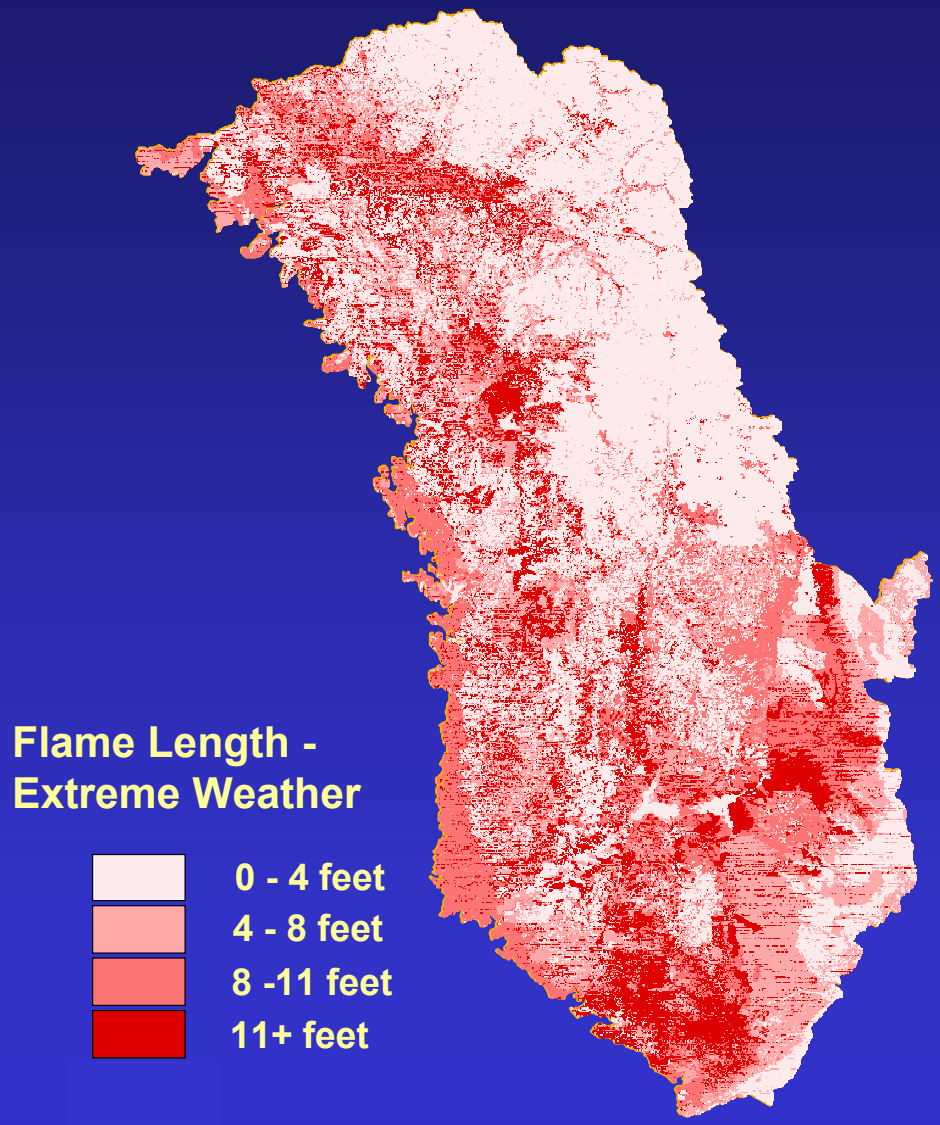


Outputs Generated:

Flame Length (FML)

Crown Fire Activity (CFR)

Rate of Spread (ROS)



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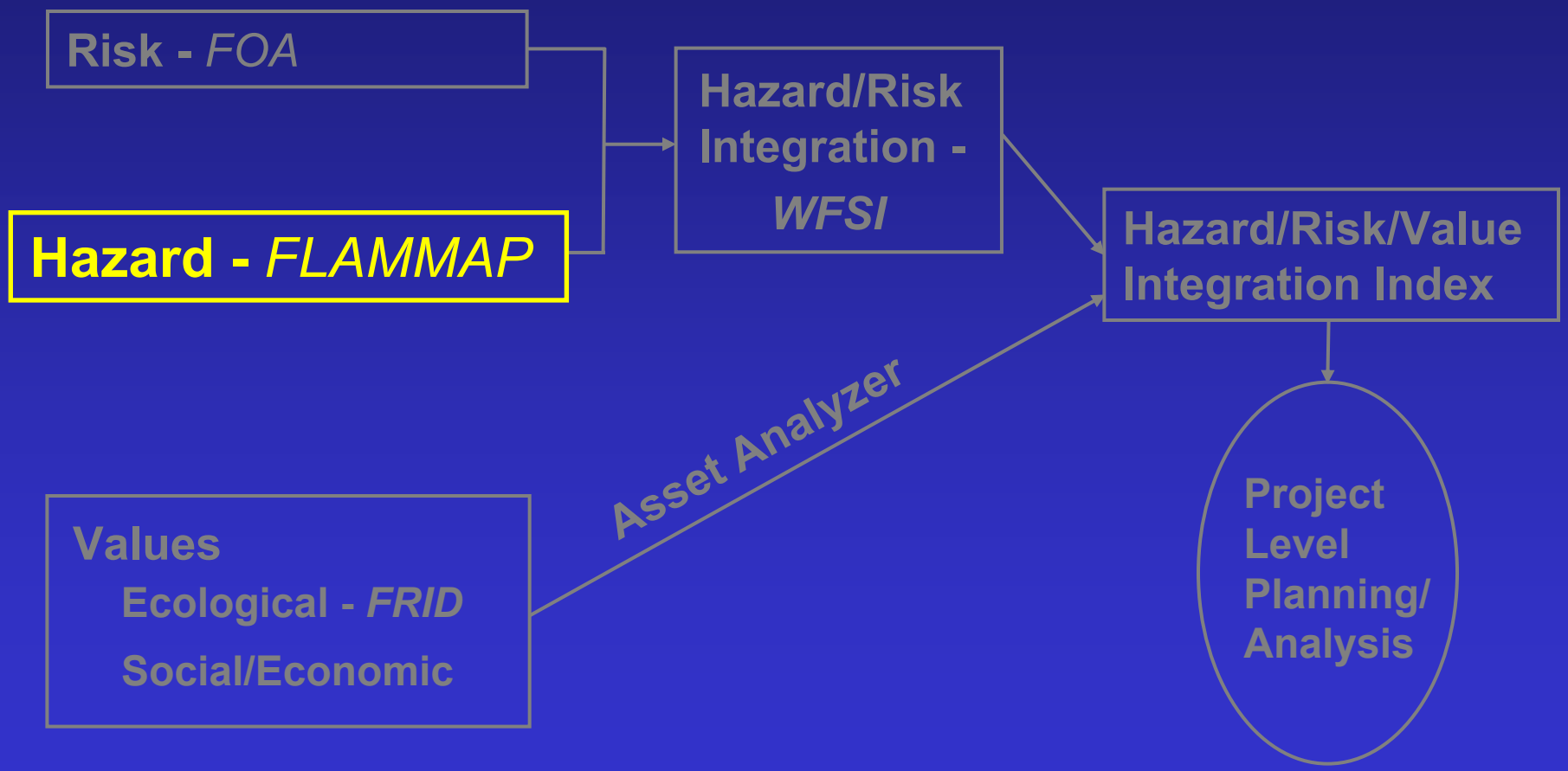


FLAMMAP

Goal: Measure fire “Hazard” or predict fire behavior across the landscape.

Required Spatial Datasets

- Slope
- Aspect
- Elevation
- Canopy Cover
- Fuel Code
  w/ weather dependent fuel moisture data

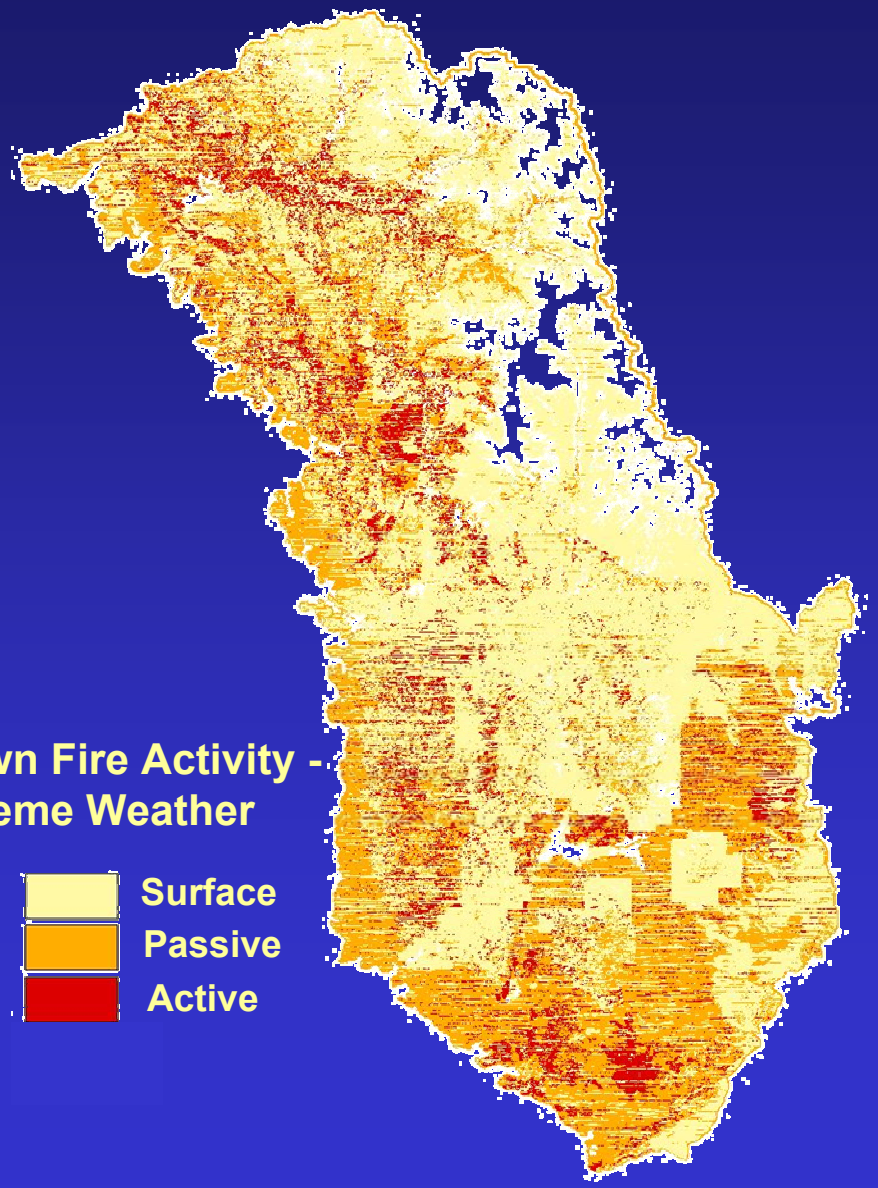
Inputs for every cell calculation

Optional Canopy Characteristic Datasets

- Tree Height
- Crown Bulk Density
- Crown Base Height

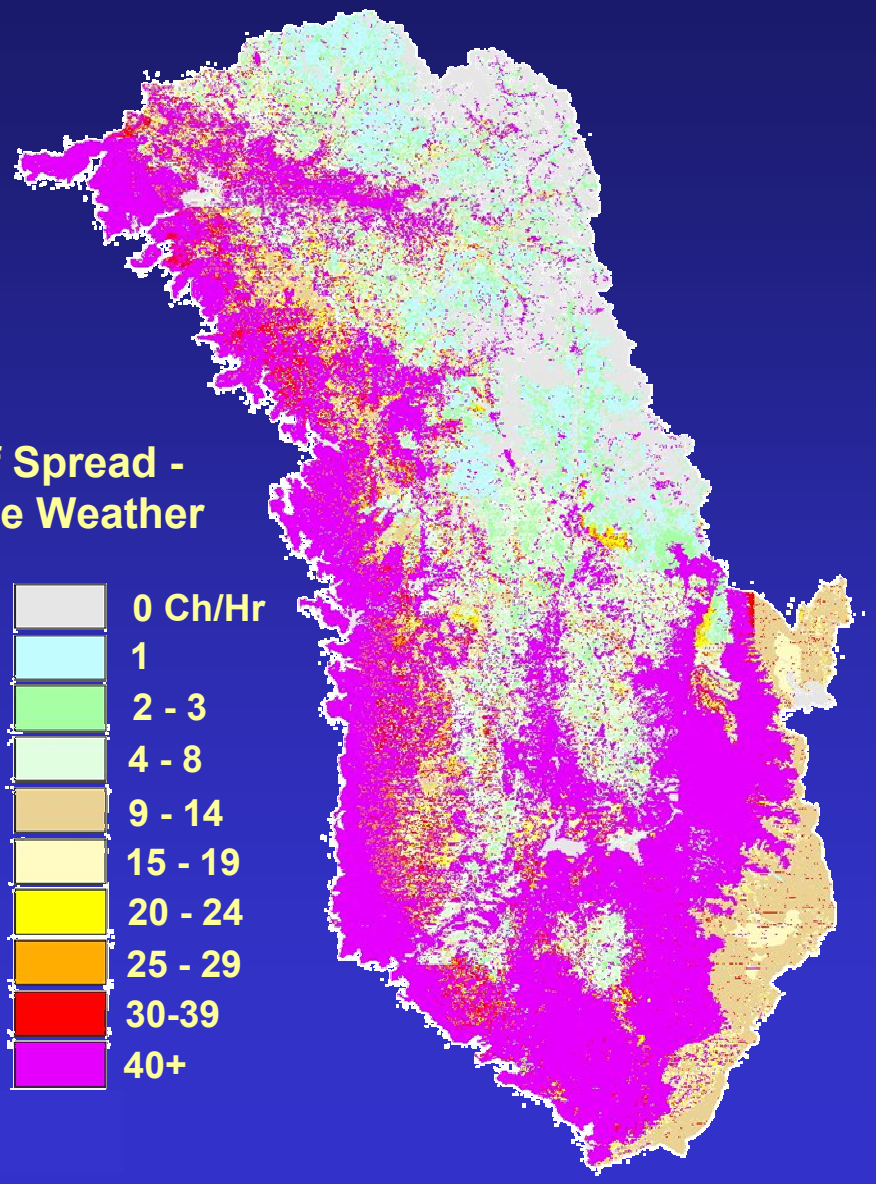
Outputs Generated:

- Flame Length (FML)
- **Crown Fire Activity (CFR)**
- Rate of Spread (ROS)



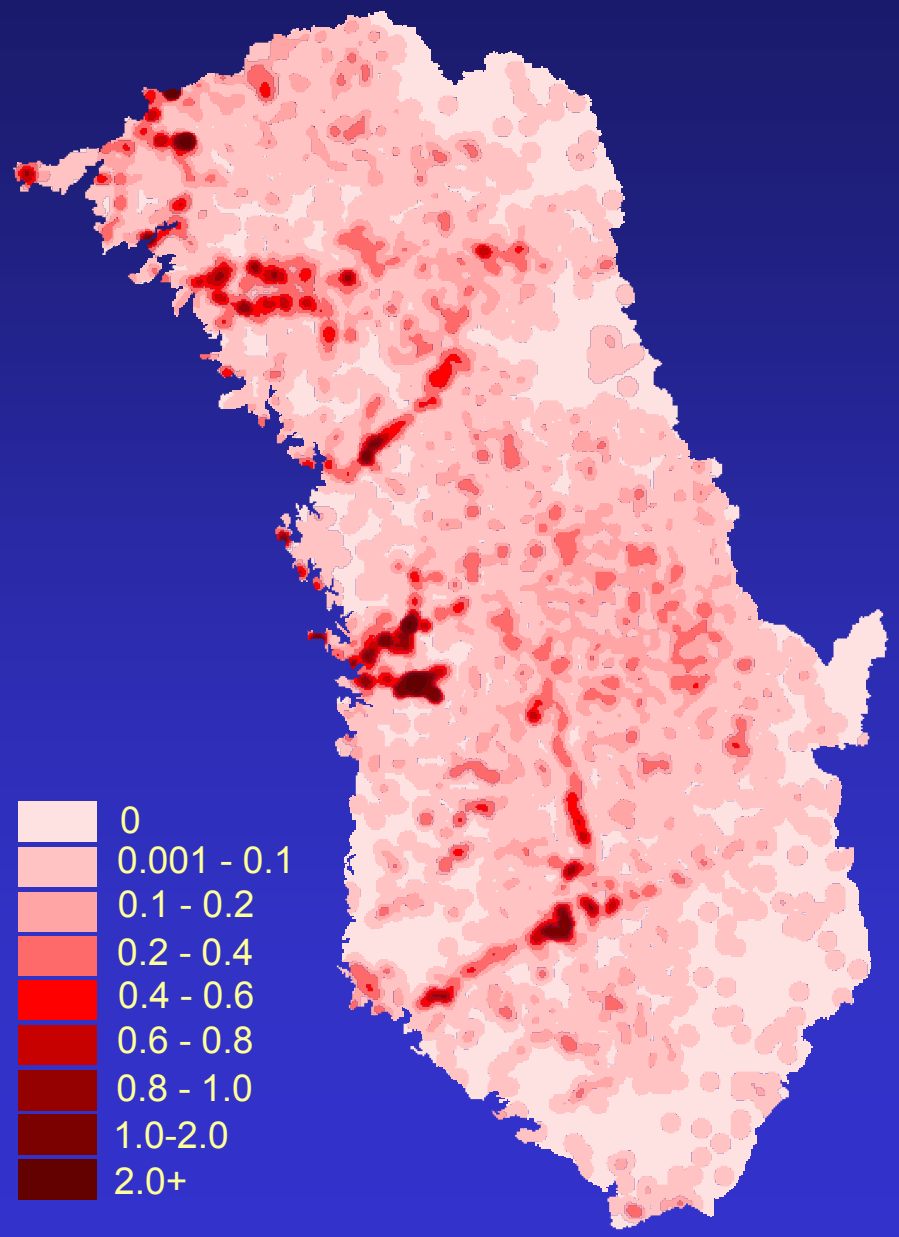
Outputs Generated:

- Flame Length (FML)
- Crown Fire Activity (CFR)
- **Rate of Spread (ROS)**



FOA Classes

Ignitions per 1000 acres per year



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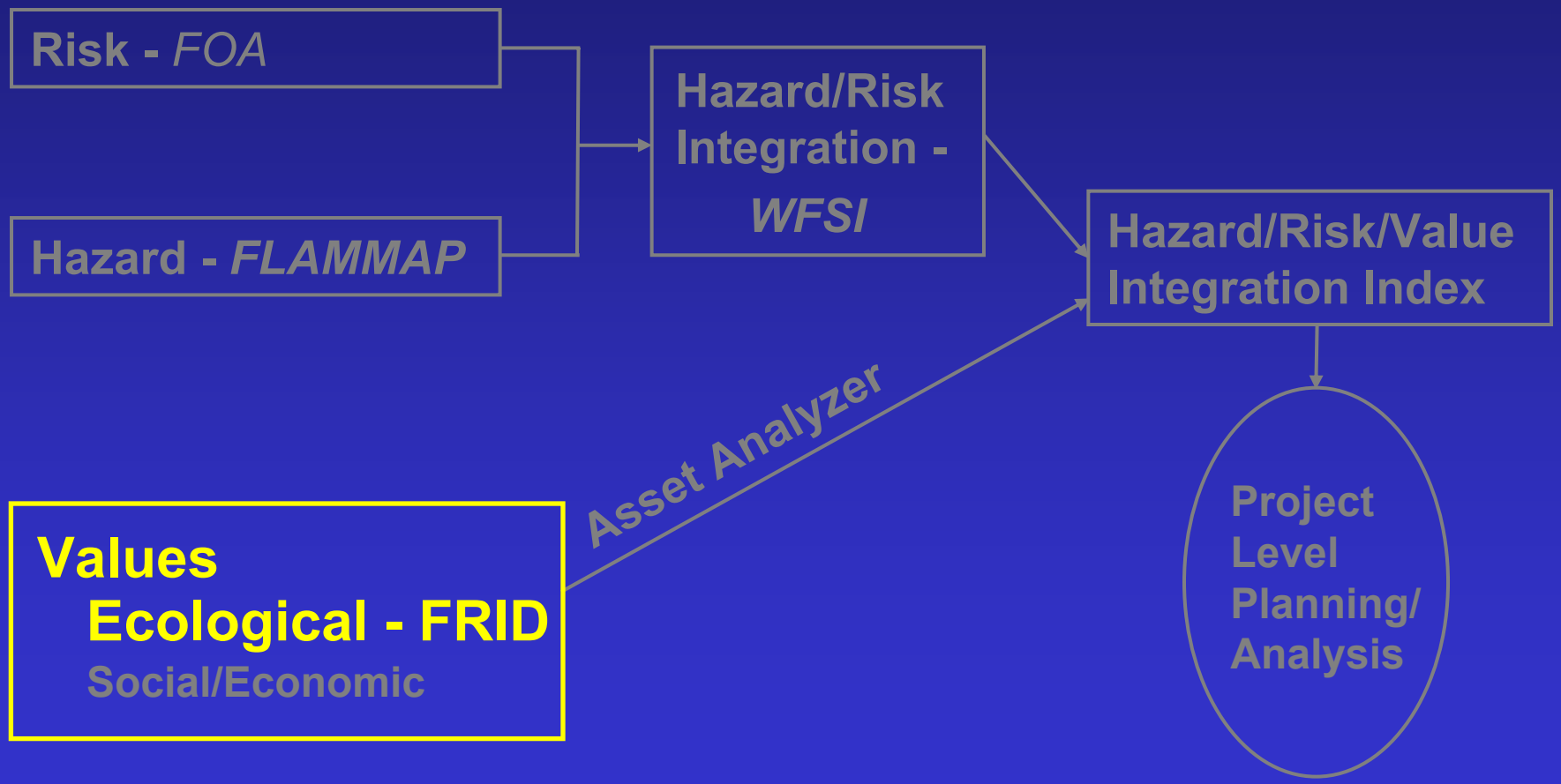


FRID

Fire Return Interval Departure

Goal: Categorizes areas based on the deviation from pre-Euroamerican settlement fire regimes.

Source Data:

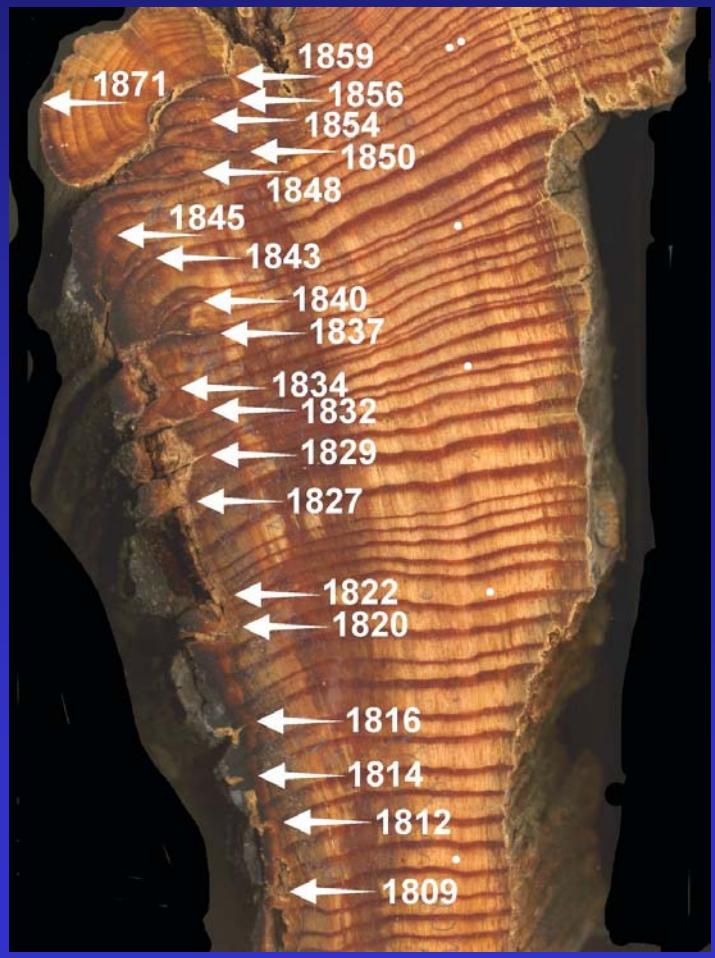
Vegetation Classification - All agencies data cross-walked to Wildlife Habitat Relationship (WHR) veg codes.

Historic Fire Perimeters - approx. 1900+

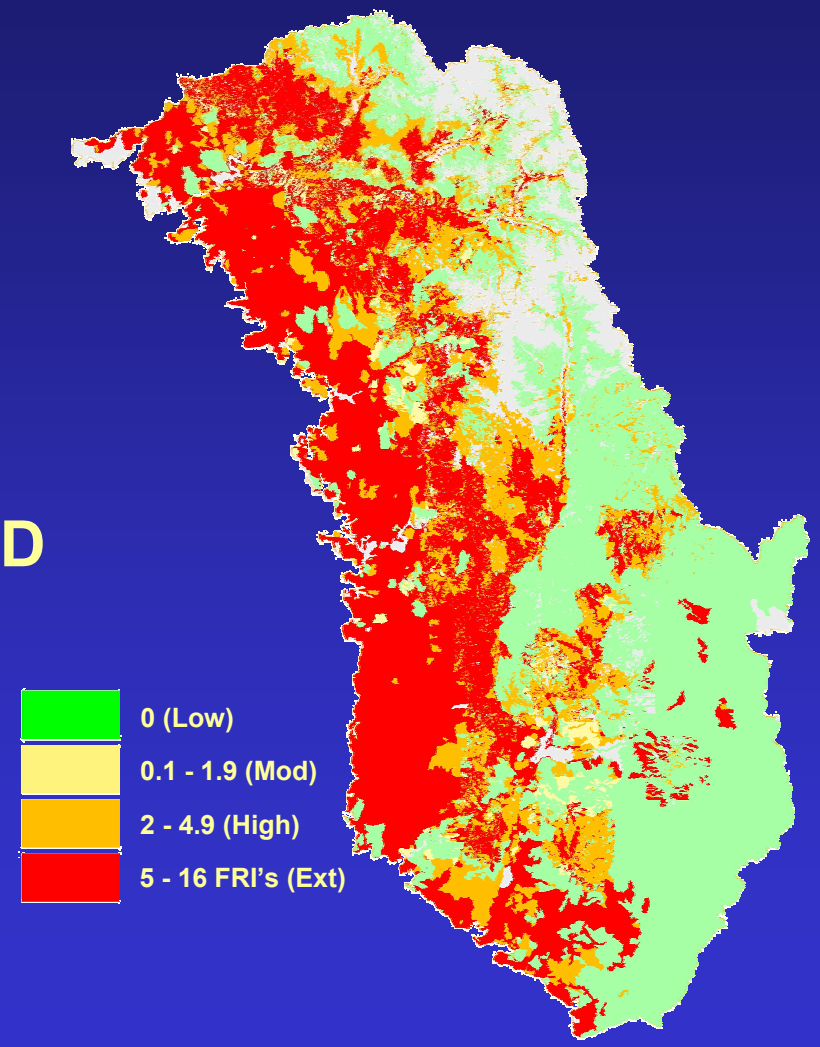
Historic Fire Return Intervals (FRI) for each WHR veg type.

Fire Return Intervals

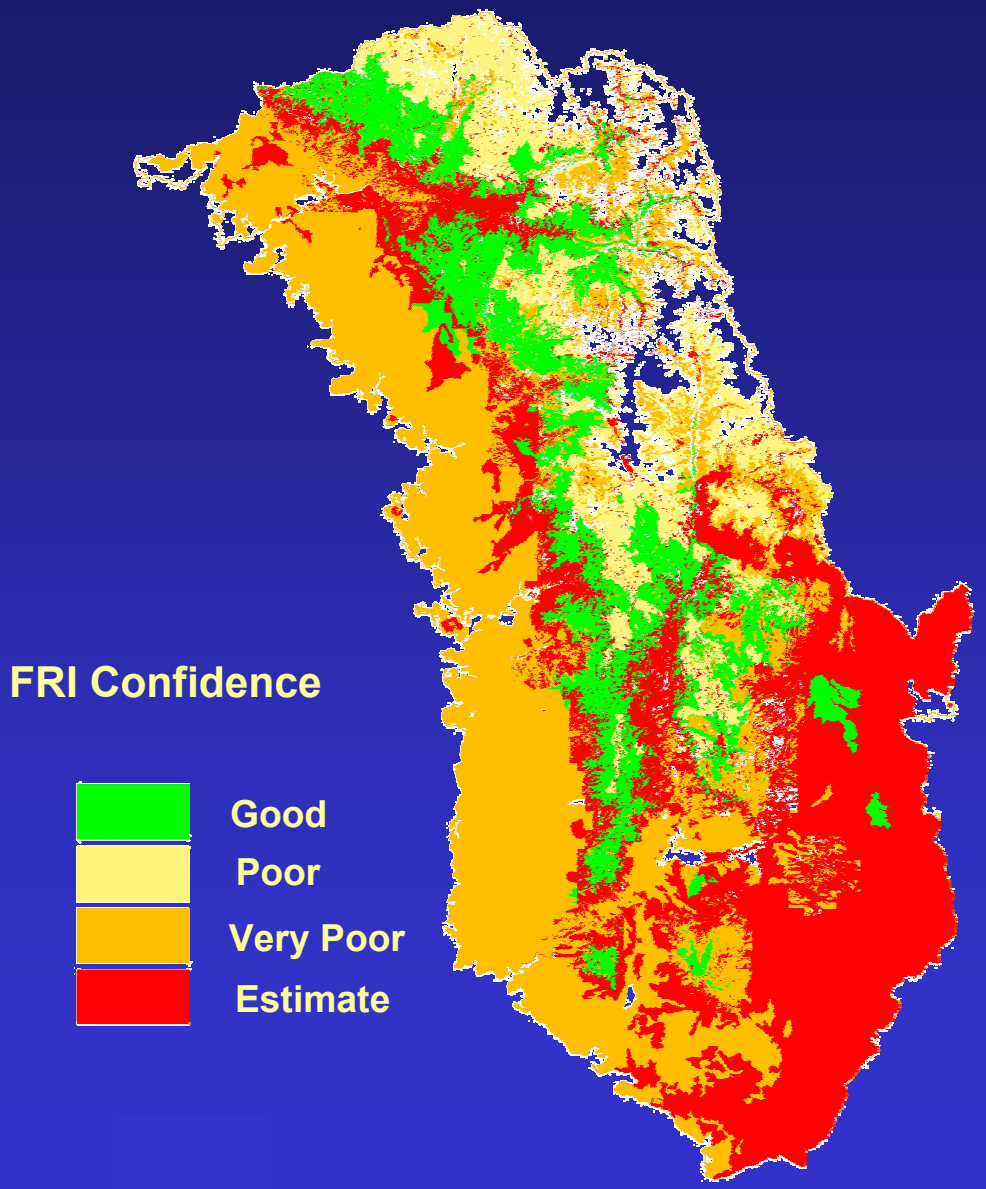
Vegetation Classification	FRI
1 - Ponderosa Pine-Mixed Conifer	7
2 - White Fir-Mixed Conifer	16
3 - Red Fir Forest	50
4 - Lodgepole Pine Forest	163
5 - Xeric Pine Forest	50
6 - Subalpine Conifer	508
7 - Foothills Hardwood/Grass	17
8 - Foothills Chaparral	60
9 - Mid -Elevation Hardwood	23
10 - Montane Chaparral	75
11 - Meadow	65



Fire Return Interval Departure



Level of Confidence in FRI values



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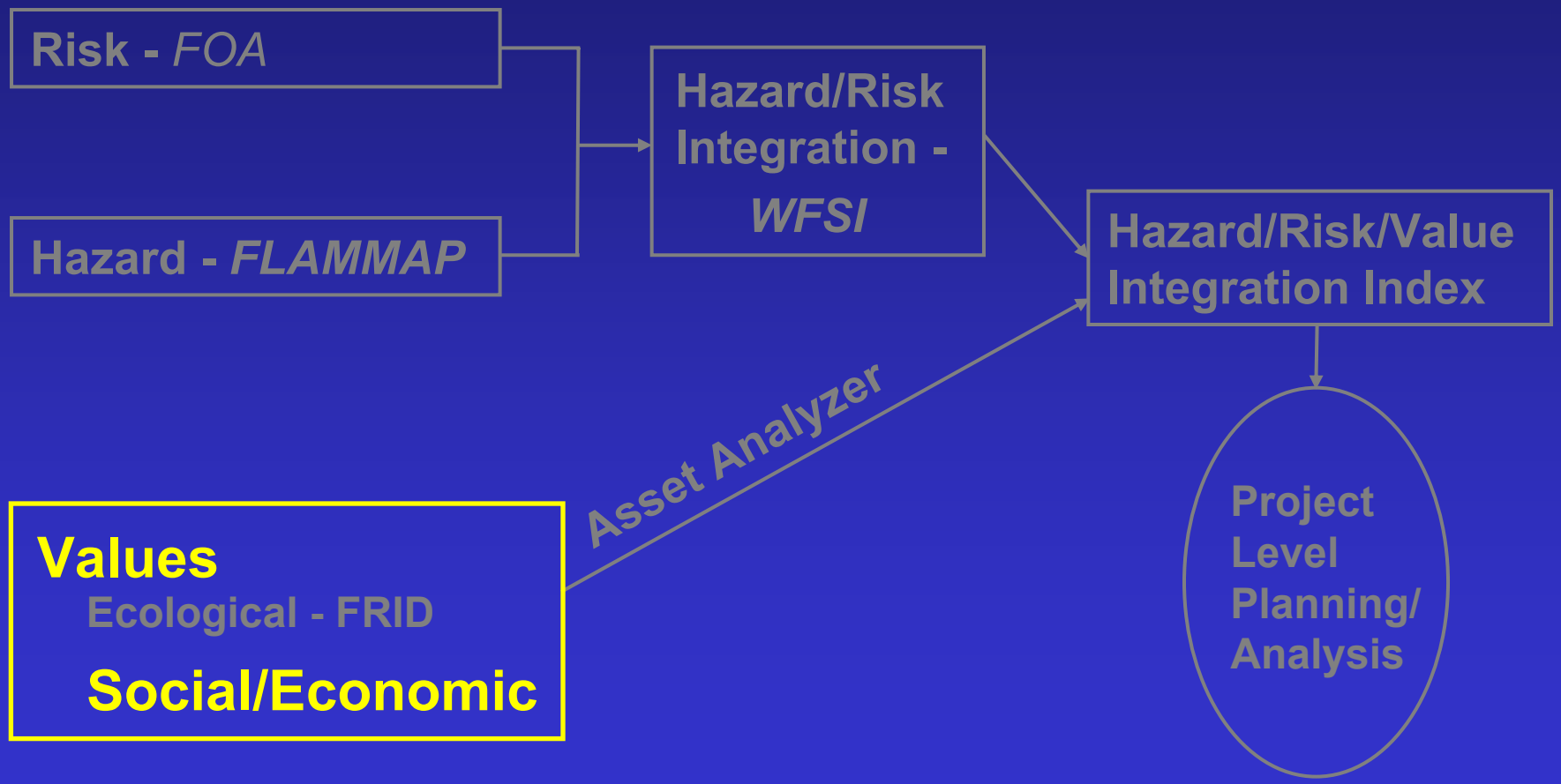


Social/Economic Values

Goal: Identify and evaluate the social and cultural assets present in the analysis area.

Source Datasets:

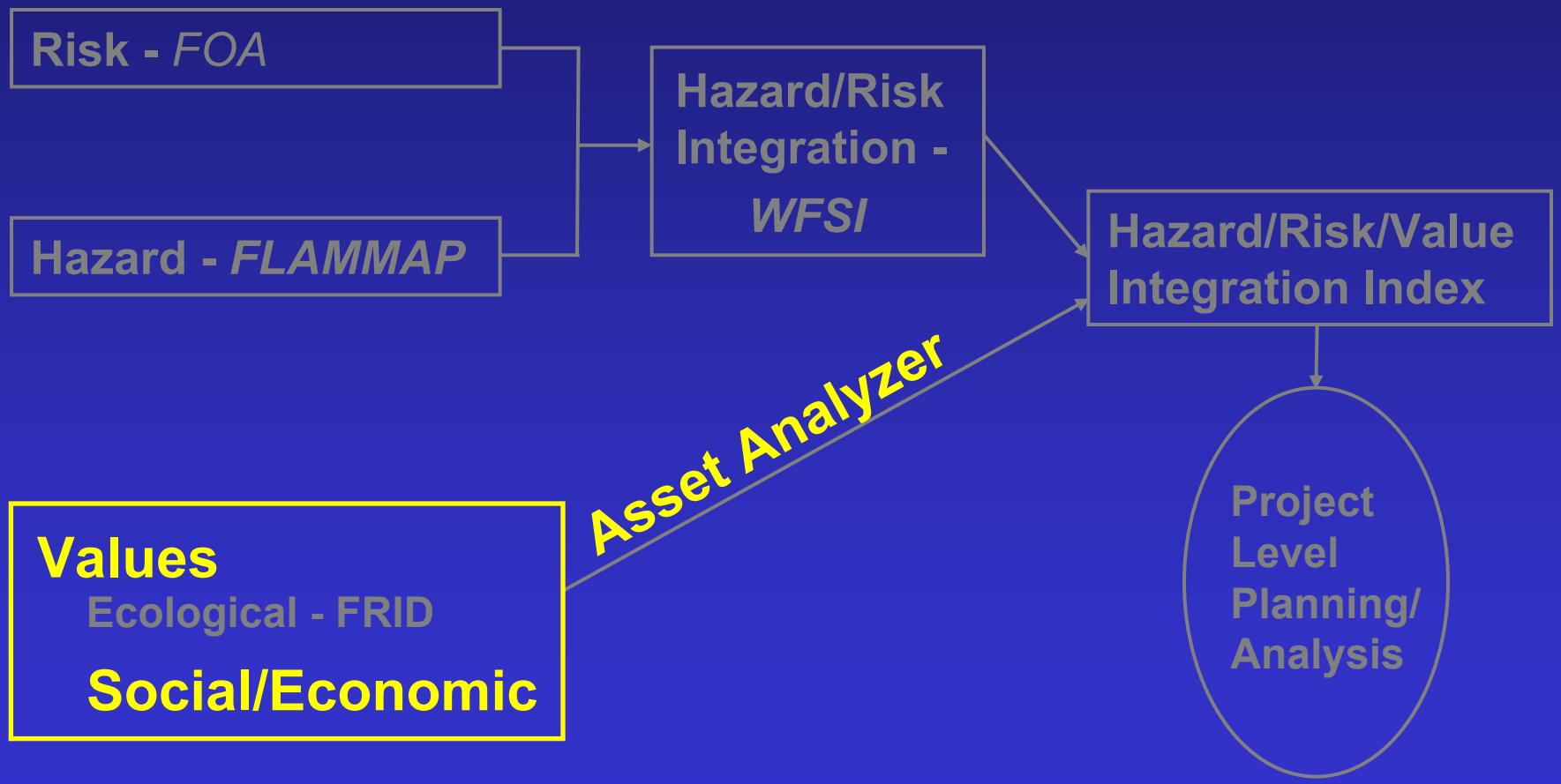
SSGIC developed asset layers

Additional asset layers identified by agency

SSGIC Developed Datasets

- Hydroelectric Power
- Water Supply
- Water Storage
- Structures
- Threatened Wildland Urban Interface (WUI)
- Sequoia Groves
- Range Value
- Soil Erosion Potential

SSGIC Analysis Framework



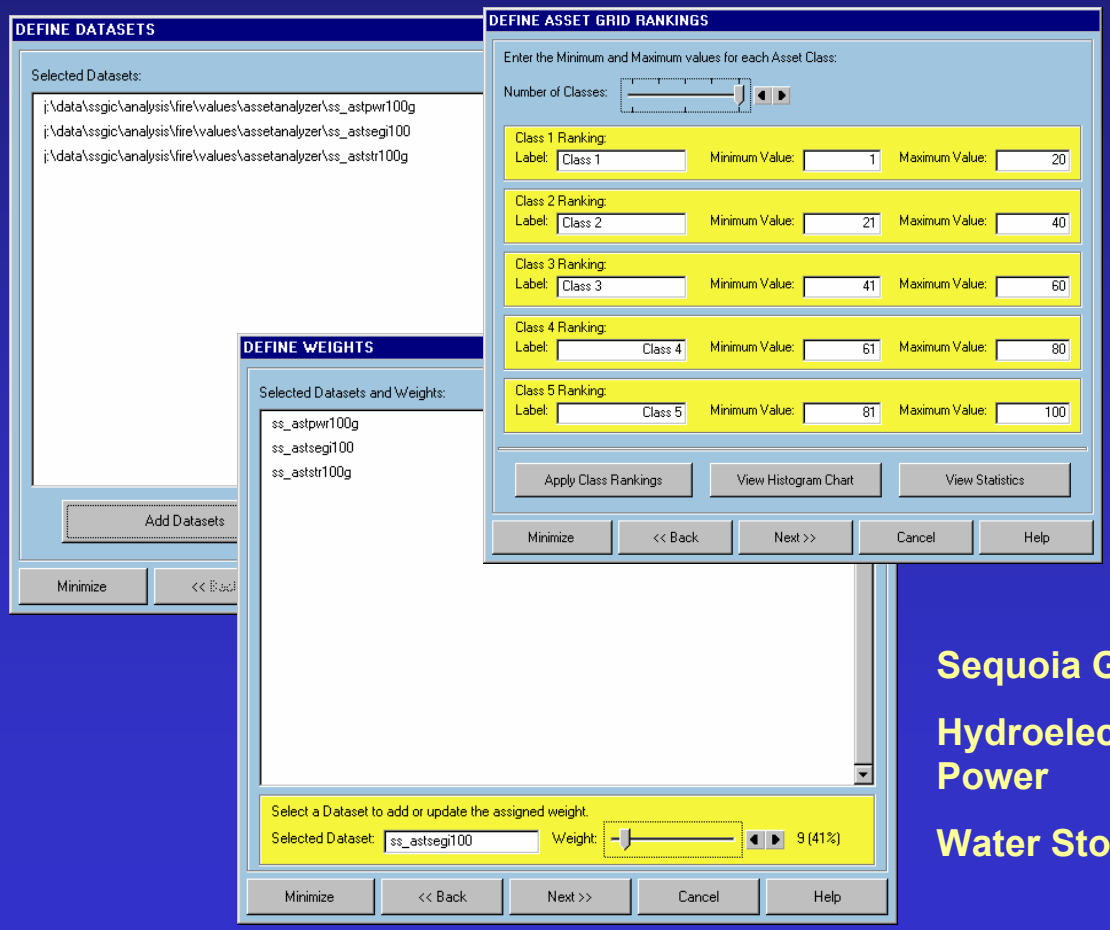
Asset Analyzer

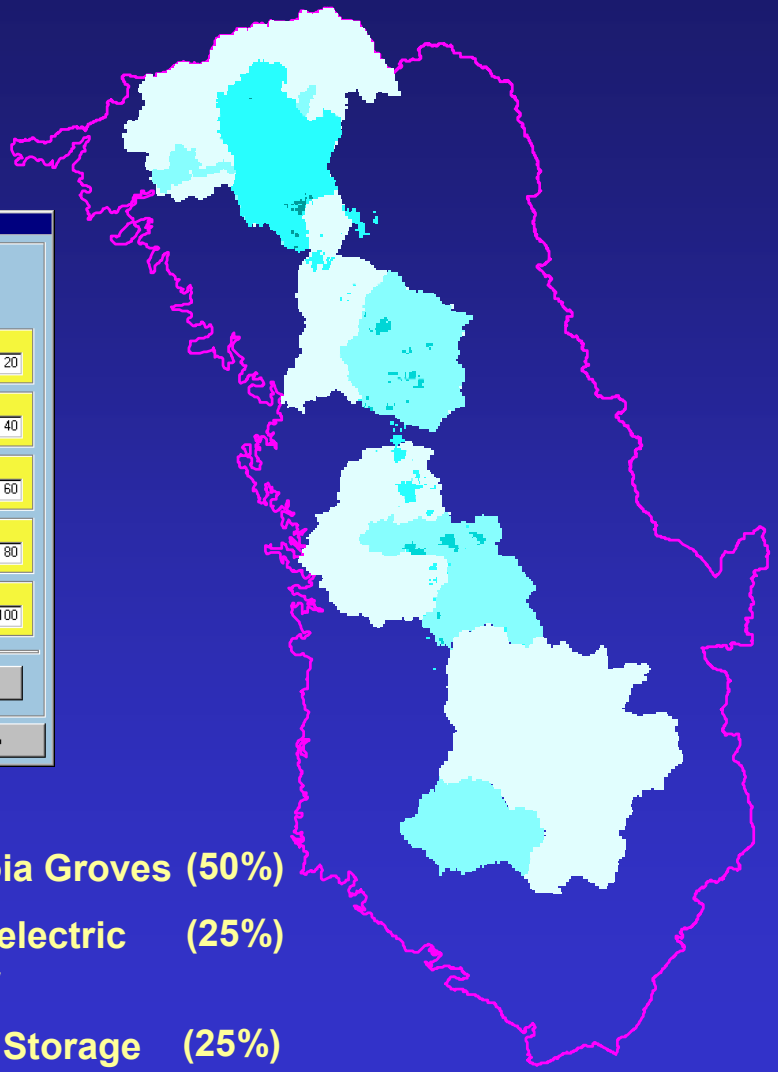
Decision Making Application Software

Developed as an ArcView 3.2 Extension requiring Spatial Analyst

Source data formatted as normalized raster data with values between 0 and 100

Asset Analyzer Application & Scenario Development



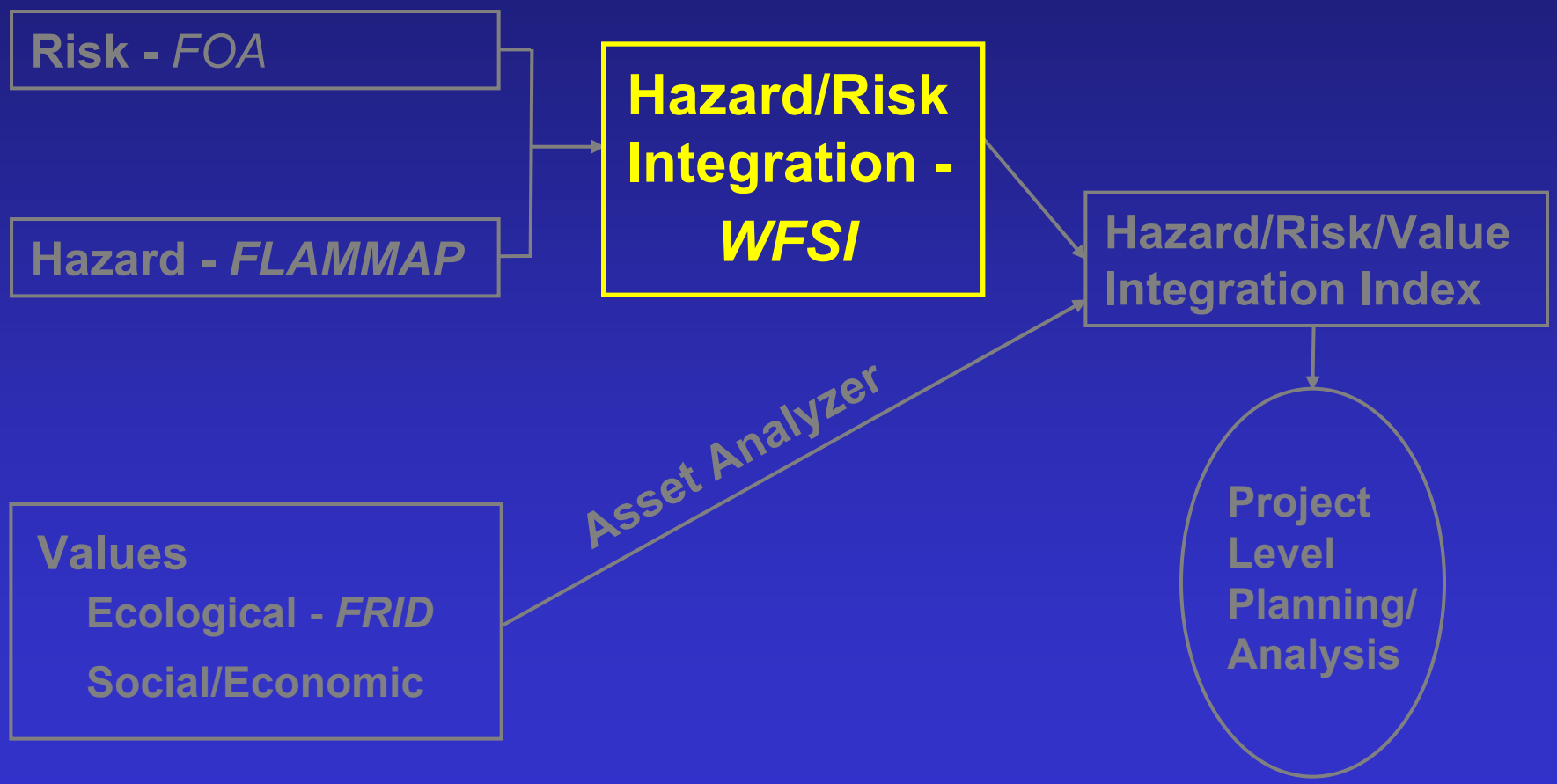


Sequoia Groves (50%)

Hydroelectric Power (25%)

Water Storage (25%)

SSGIC Analysis Framework



WFSI

Wildland Fire Susceptibility Index

GOAL: Integrate the FOA (Risk) Probability of Ignition with FlamMap Rate of Spread (Hazard) to ordinate the landscape by the "Susceptibility to Burning".

Step 1

Likelihood of Ignition - FOA Ignition Density

"Probability of Burning" for each cell

Step 2

FOA Ignition Density – Calculate Actual Ignitions in each FOA Class

"Probability of Burning" for each cell

Assign Spread Component to each Ignition by linking to daily Weather Data

Step 3

FOA Ignition Density – Calculate Actual Ignitions in each FOA Class

"Probability of Burning" for each cell

Assign Spread Component to each Ignition by linking to daily Weather Data

Calculate Rate of Spread (ROS) - predicted by FLAMMAP model

Step 4

FOA Ignition Density – Calculate Actual Ignitions in each FOA Class

"Probability of Burning" for each cell

Assign Spread Component to each Ignition by linking to daily Weather Data

Calculate Rate of Spread (ROS) - predicted by FLAMMAP model

Develop local regression equations relating ROS to Final Fire Size

Step 5

FOA Ignition Density – Calculate Actual Ignitions in each FOA Class

"Probability of Burning" for each cell

Apply regression equations to calculate FFS from ROS

Assign Spread Component to each Ignition by linking to daily Weather Data

Calculate Rate of Spread (ROS) - predicted by FLAMMAP model

Develop local regression equations relating ROS to Final Fire Size

Step 6

Calculate WFSI from data in steps 1-5

FOA Ignition Density – Calculate Actual Ignitions in each FOA Class

"Probability of Burning" for each cell

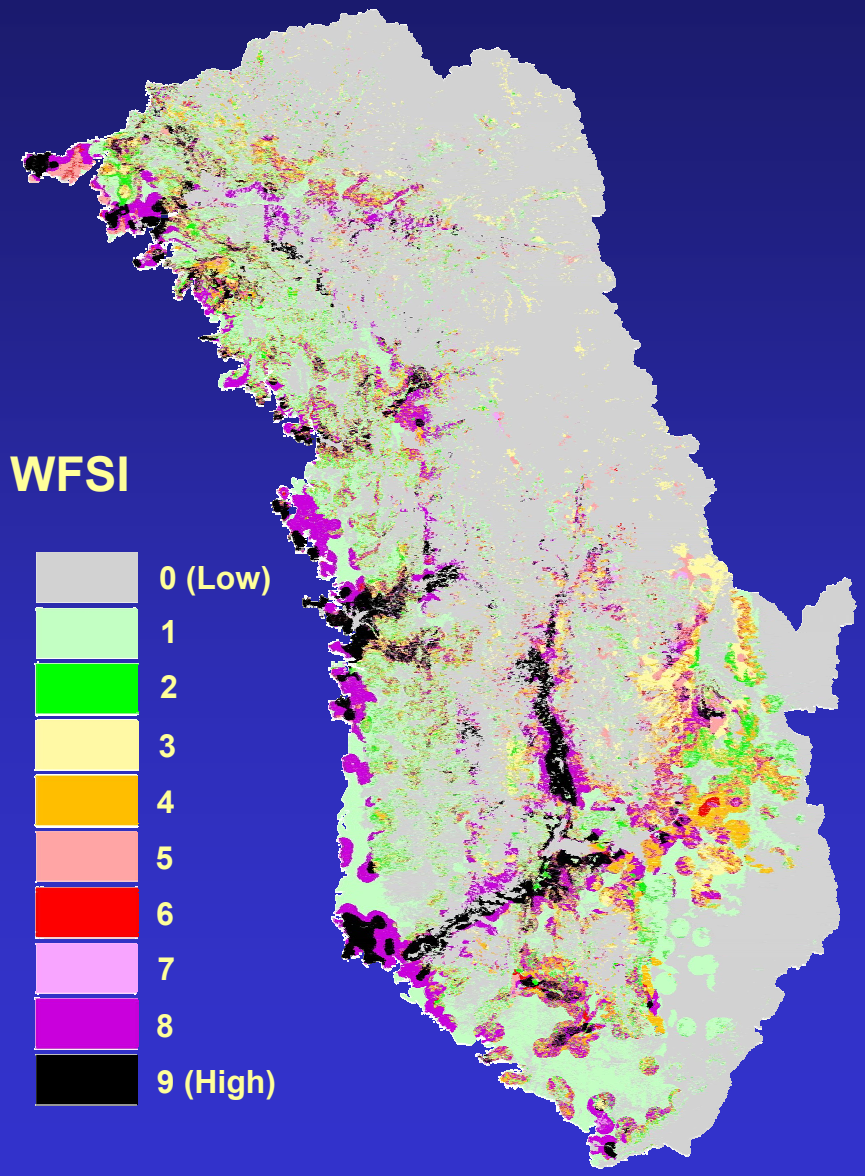
Apply regression equations to calculate FFS from ROS

Assign Spread Component to each Ignition by linking to daily Weather Data

Calculate Rate of Spread (ROS) - predicted by FLAMMAP model

Develop local regression equations relating ROS to Final Fire Size

Wildland Fire Susceptibility Index



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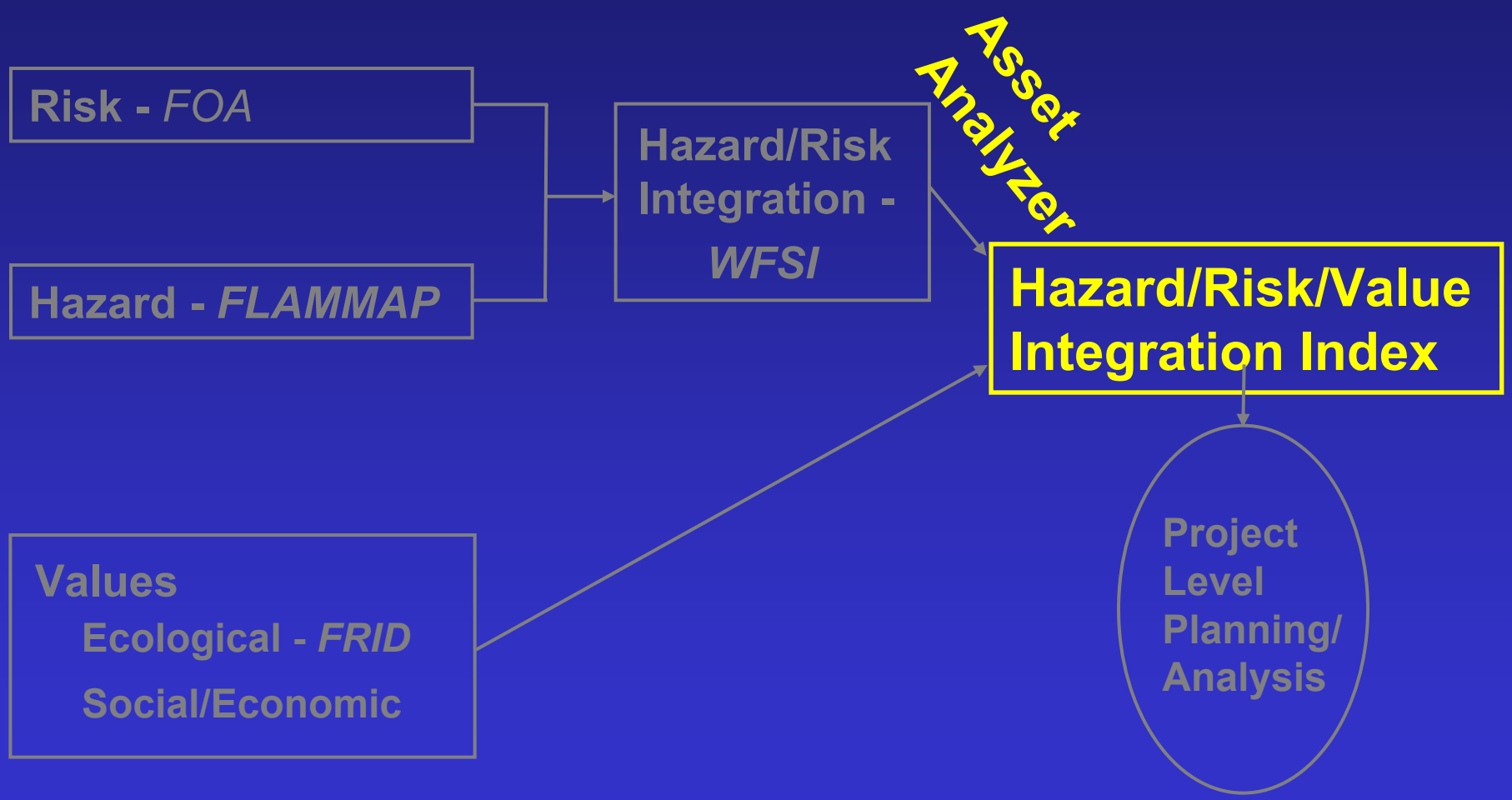
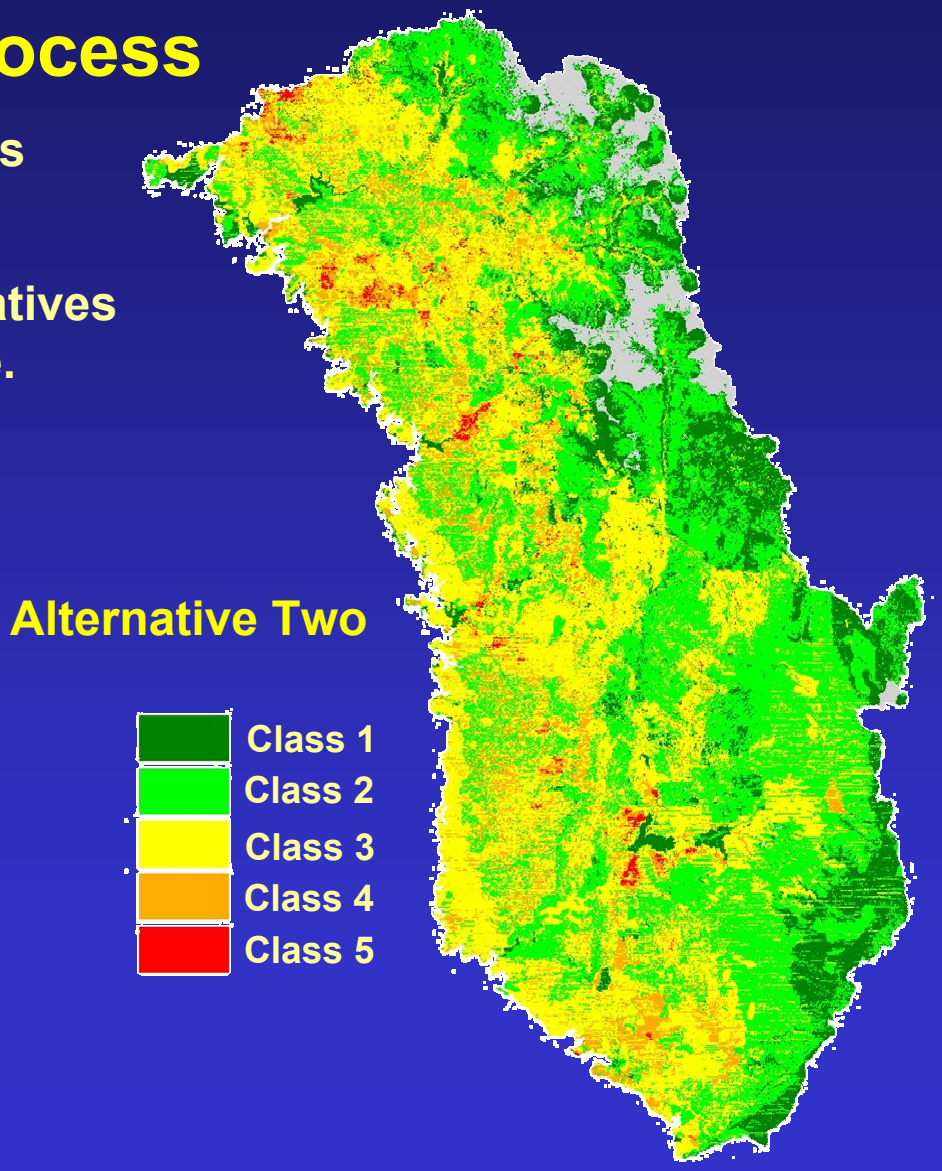


Final Integration Process

1) Review available data and analyses and select driving datasets.

2) Develop 10 landscape level alternatives based on these datasets and analyze.

3) Select a preferred alternative.



Final Integration Process

1) Review available data and analyses and select driving datasets.

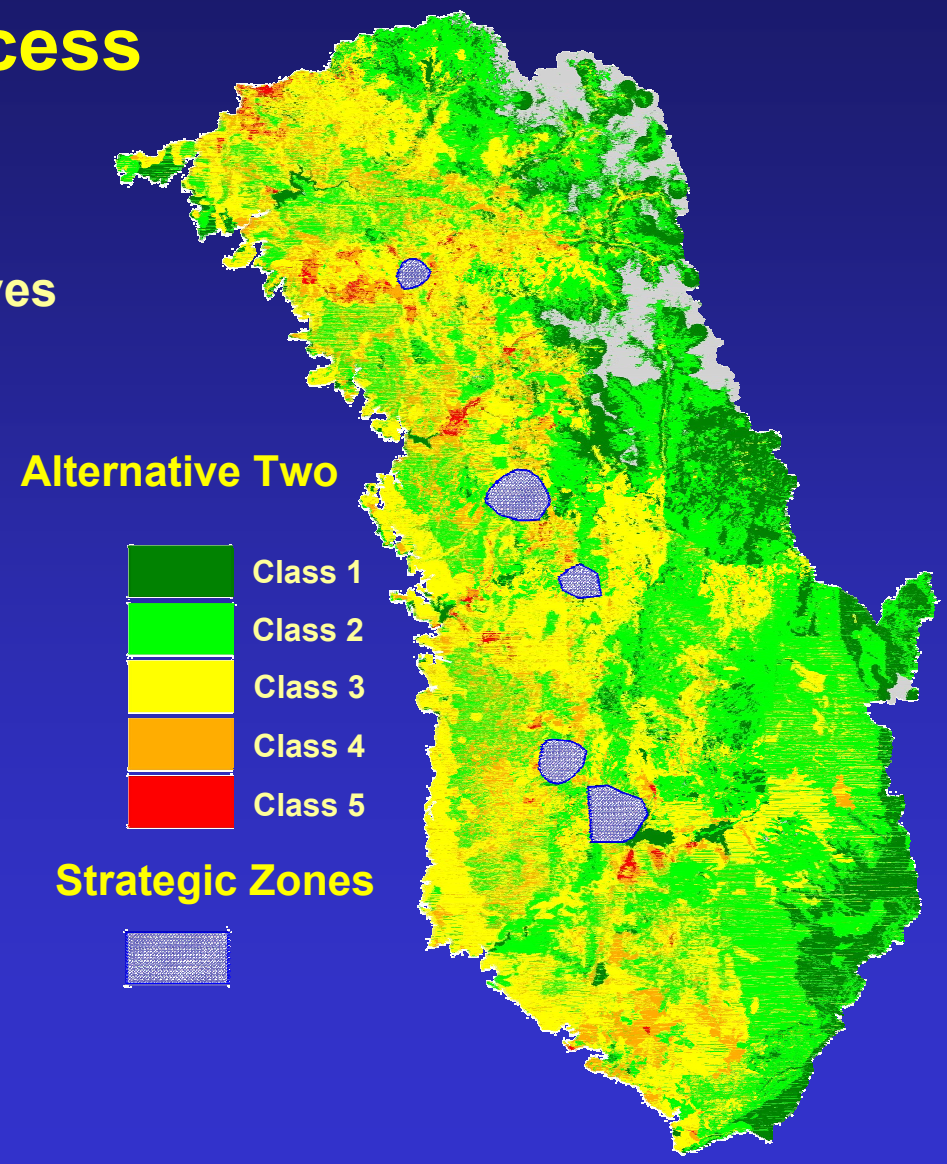
2) Develop 10 landscape level alternatives based on these datasets and analyze.

3) Select a preferred alternative.

4) Identify "strategic zones" for project level analysis.

5) Capture "decision rules" effectively implemented in identifying strategic zones.

6) Next: Automate process to implement decision rules.



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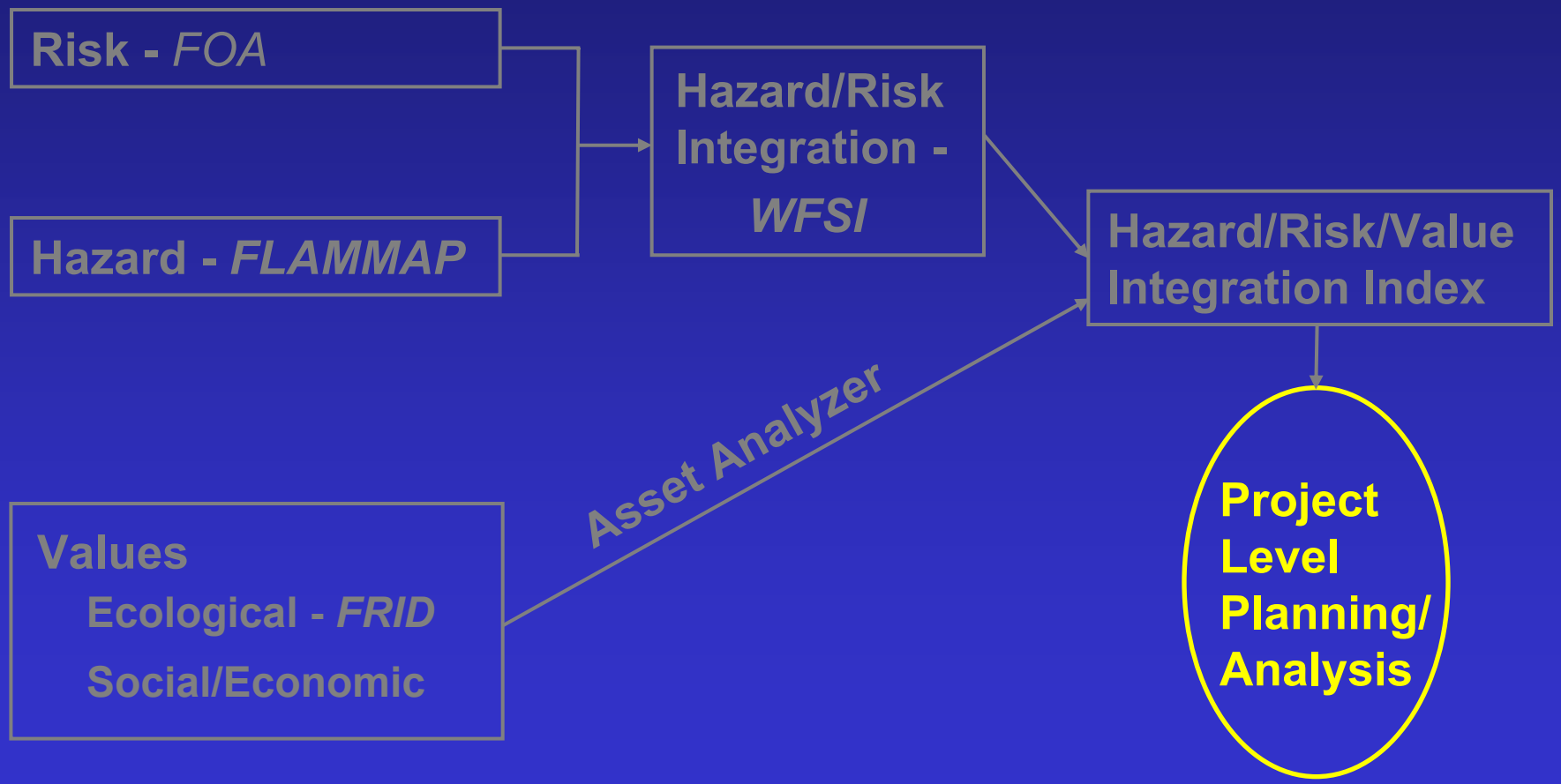

Thank You!