Indian Valley Pond Policies.

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Our location

- The spot we are focusing on is in the Indian Valley preserve.
- It is a small pond and the land around it.
- Our area is 810 feet by 805 feet.
- The picture can be seen below.

Policy Change

- Placement of solar panels next to the pond
- And putting in a picnic area
- This will require the removal of numerous trees.
- The area will generate power, be used as a rest spot for hikers, and used to educate students in the nearby school about the benefits of solar power.



About Solar Policy

- **The solar panels will power the Indian Valley College**
- System Size: 6.1 kW
- 24 panels with 255 watts
- The area we will use is in green and its 16915.06 feet².
- Solar panels take up 1,200 sq. ft
- Estimated monthly energy output:595 kWh

Reasons for Solar Policy

- Solar panels can pay back their energy costs within 4-7 years
- 75 million barrels of oil and 35 million tons of carbon dioxide are saved annually by solar energy users.
- The amount of sunlight that hits the Earth in 1 minute meets the world’s energy demands for an entire year
- The solar power will help stop global warming
- Solar panels prices have been rapidly decreasing over years

Details

- ground mounted solar panels
- Wind resistant
- Water resistant
- Will be tilted to the sun’s angle

Picnic Area Policy

- **Will be rest spot for hikers + learning area**
- Area is 22,465 square feet
- Put in 12 Picnic tables
- Will be 64-3/4 in. x 66 in.
- Each bench will take about 30 square feet
- We will have about 60 square feet around benches for space

The Picnic Area will Require the Removal of sixteen trees

Cost of everything

Picnic Area

- Cost, including stump removal, will be around $11,300
- Cost of picnic tables is $4,276.44
- Cost of Picnic Area Total: $15,576.44

Solar Panel

- **Cost of Solar panels:** $32,900

Cost of Everything: $48,476.44

Before Policy

After Policy

Technical Details: Policy

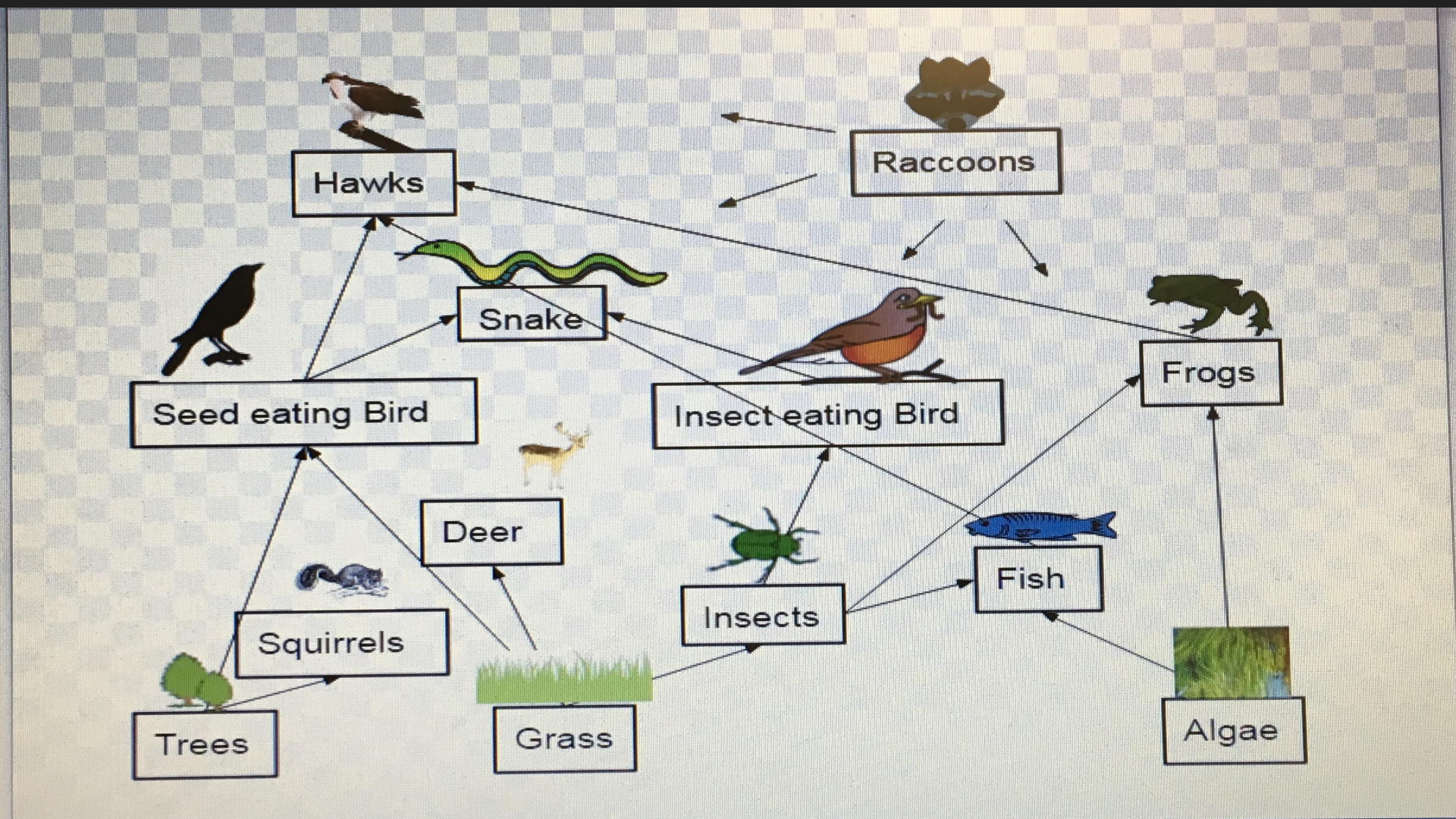
- Solar panels average 0.4% degradation per year
- This means after 20 years, a panel have 92% of its original efficiency
- If we want to wait for 80% before replacing, it will take roughly 40 years
- Commercial solar panels only have 22% efficiency.

Current Conditions

- Ground Condition: Muddy, high clay content
- Abiotic factors: Water, elevation, sunlight
- Climate: Warm dry summers, cool wet winters
- Species: Apex coyote, autotrophs oak and bay trees
- Biodiversity: Average
- Carrying capacity: Higher than average

Current flow of energy

- Oak and Bay trees Producers/autotrophs
- Insects eat trees
- Salamanders and frogs eat insects
- Frogs and salamanders eaten by birds and coyotes
- Birds eaten by snakes
- Nuts of oak and bay eaten by squirrels
- Fox eats whatever it finds
- Raccoon is main detritivore


Hawks
Raccoons
Snake
Seed eating Bird
Insect eating Bird
Frogs
Deer
Squirrels
Insects
Fish
Trees
Grass
Algae

Matter Cycle

- Actually five cycles:
  - Water cycle:
    - The cycle water takes to circulates from the land to the sky and back again.
  - Carbon Cycle:
    - Carbon moves from air to water or ground, then back
  - Nitrogen cycle:
    - Nitrogen in air changed into useable form by bacteria, is used by plants and animals, then is changed back by bacteria and released into air
  - Phosphorus cycle:
    - Phosphorus moves from land to water and back
  - Sulphur cycle:
    - Sulphur moves through land, water, and air

With Policy: 50 Years

- Climate: Temperature up by 1-2 degrees Celsius
- Ground condition: Less water
- Abiotic factors: Solar panels installed
- Population: Less trees, less everything
- Carrying capacity: Lessened due to less trees
- Carrying Capacity: Lessened (less trees)
- Biodiversity: Lessened
- Populations: Less trees
- Flow of energy: Less autotrophs
- Species behavior: still afraid of humans
- Unchanged: Main species, food web, matter cycling

Without Policy: 50 Years

- Climate: Temperature up by 2 to 3 degrees Celsius
- Ground Condition: Slightly dryer
- Abiotic Factors: Marginal erosion
- Main Species: Coyote still apex predator
- Carrying Capacity: Slightly less water, may be reduced
- Population: Marginally less
- Unchanged: Food web, carrying capacity, biodiversity, populations, matter cycling, flow of energy, species behavior

With Policy: 100 years

- Climate: Temperature still up by 1-2 degrees Celsius
- Ground condition: Same as now
- Abiotic factors: Solar panels replaced, pond water may be reduced
- Biodiversity: Less trees, less animals that rely on trees
- Food web: Less autotrophs
- Unchanged: Main species, food web, populations, matter cycling, flow of energy
- Carrying capacity: Less water, lessened further
- Biodiversity: Lessened
- Species Behavior: Cautious, afraid

Without Policy: 100 years

- Climate: Temperature increased by 4 to 5 degrees Celsius
- Ground condition: Less water, less plant remains as less plants
- Abiotic factors: Pond drier
- Main species: Less frogs
- Biodiversity: Slightly reduced, less water animals
- Population: Smaller
- Food web: Water portion reduced
- Carrying capacity: Lessened, less water
- Matter cycling: Water cycle reduced
- Flow of energy: Less water-based organisms
- Species behavior: Unchanged

With Policy: 300 years

- Climate: Temperature up by 3-4 degrees Celsius
- Ground condition: Completely dry
- Population: A great deal less trees
- Carrying capacity: Stable, less than original
- Abiotic factors: More rain, some erosion
- Main species: Less water organisms
- Unchanged: Food web, Flow of energy
- Matter cycle: Changed
- Species behavior: Afraid

Without Policy: 300 years

- Climate: Temperature up by 6-9 degrees Celsius
- Abiotic factors: Pond mostly dry
- Population: Decreased
- Biodiversity: Less water-based organisms
- Ground Condition: Completely dry
- Main species: No frogs
- Food web: Greatly changed
- Species behavior: Different as warmer
- Flow of energy: Greatly changed

With Policy: 1000 Years

- Climate: Temperature up by 6-7 degrees Celsius
- Ground condition: More water
- Carrying capacity: More water organisms, less land organisms
- Population: Increased animals, trees grown back
- Abiotic factors: Solar panels likely gone, more rain
- Species behavior: Normal
- Food web: Mostly unchanged

Without Policy: 1000 Years

- Climate: Increased by over 15 degrees Celsius
- Biodiversity: Extremely small
- Abiotic factors: No water
- Main species: Oak and Bay trees, Small Insects
- Population: next to none
- Ground condition: Extremely dry
- Food web: Reduced due to lack of water
- Matter cycling: Water cycle mostly gone
- Species behavior: New ways to get water

Policy Effects Worldwide

- To promote our project on a global scale, we will be making a website detailing the changes we are making to the site, and their effect.
- We will also be teaching the students in the nearby school about the wonders of solar panels.
- At the benches, you will be able to sit down, rest after a long walk, and learn about our project.

Sources

- http://www.dovetailsolar.com/getattachment/Solar-Electric/Pricing-for-Solar-Electric-Systems/SOLAR-PV-Ground-Residential-Price-Sheet-11-24-2013af.pdf
- https://www.daftlogic.com/projects-google-maps-area-calculator-tool.htm
- http://us.waka-waka.com/solar-energy-facts/
- https://www.reference.com/geography/abiotic-biotic-factors-lakes-ad5091e20f9c12f3
- http://www.marincountyparks.org/depts/pk/divisions/open-space/indian-valley
- https://en.wikipedia.org/wiki/Energy_flow_(ecology)
- https://en.wikipedia.org/wiki/Climate_of_California
- https://en.wikipedia.org/wiki/Global_warming