


# Stormwater Impact Assessments

*Connecting primary, secondary and cumulative impacts to Hawaii's Environmental Review Process*

## TRAINING

May 29, 2013  
Maui

Presented by



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## Agenda

- 1:00 – 1:10 Introductions
- 1:10 – 1:15 Background
- 1:15 – 1:20 Introduction of Five-Step Framework
- 1:20 – 1:50 Step 1: Gather pertinent data
- 1:50- 2:15 Step 2: Determine appropriate level of analysis
- 2:15 – 2:25 BREAK
- 2:25 – 2:55 Step 3: Analyze data in light of proposed project
- 2:55 – 3:20 Step 4: Identify mitigation goals & measures
- 3:20 – 3:25 BREAK
- 3:25 – 3:35 Step 5: Summarize impacts and mitigation measures
- 3:35 – 3:45 Review checklist – Exercise
- 3:45 – 4:00 Conclusion & Questions

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## Background

- Guidance document purpose & need

*"Cumulative effects assessment is neither well understood nor well implemented and is not integrated with the planning process"*  
(University of Hawai'i, 2010)

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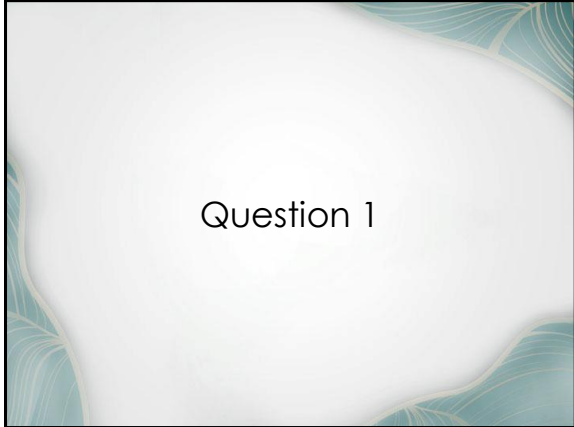
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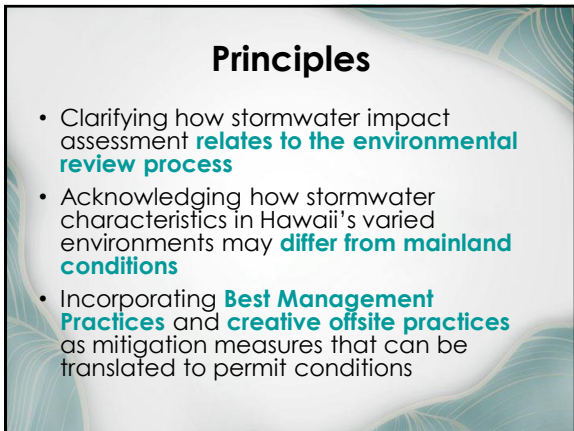
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## Primary & Secondary Impacts

### Primary (Direct)

- Occur at **same time & place** as cause
- Effects on **project site**
- Pertinent factors:
  - bare soil
  - impervious surface
  - nutrient load
  - peak flow

### Secondary

- Occur **later in time** or **removed in distance** but reasonably **foreseeable**
- **Offsite and down gradient** from project
- Examples:
  - growth-inducing effects
  - ↑ sediment in down stream water body

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## Cumulative Impacts

- Results from **incremental impact** of the action when **added to past, present, and reasonably foreseeable future actions**
- Occurs **within boundaries of a watershed**



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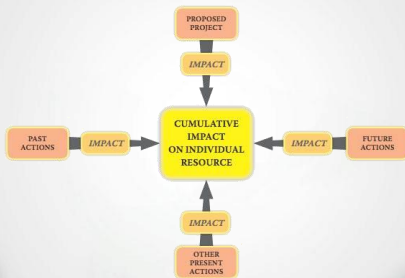
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## Cumulative Impacts



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## Question 2

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### Relationship to State Planning Policies

- Hawaii State Plan Goal (HRS § 226-4 (2))
- Hawaii State Plan Priority Guideline (HRS §226-108)
- Federal Coastal Zone Management Act (HRS §205A-2)
- Significance Criteria (HAR §11-200-12)



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### Five-Step Framework

1. Gather pertinent data
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
4. Identify mitigation goals & propose mitigation concepts
5. Summarize impacts & mitigation

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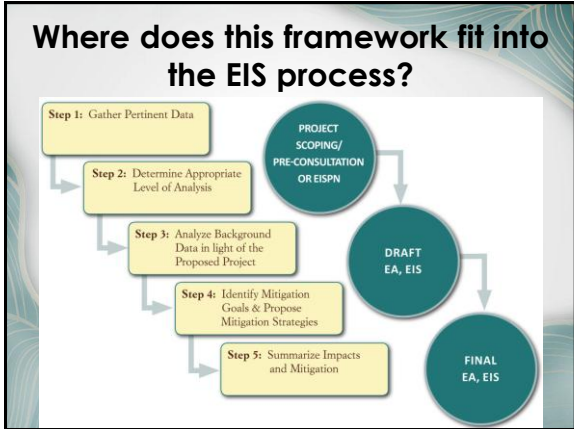
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- ### Five-Step Framework
1. Gather pertinent data
  2. Determine appropriate level of analysis
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### Step 1: Gather pertinent data

**Objective:** Collect & document pertinent data about existing site & watershed conditions

**Methodology:** Use best available data and early consultation to document site and watershed hydrology, stressors and sensitivity. Document anticipated stormwater permit requirements as well as management programs that pertain to site and watershed resources.

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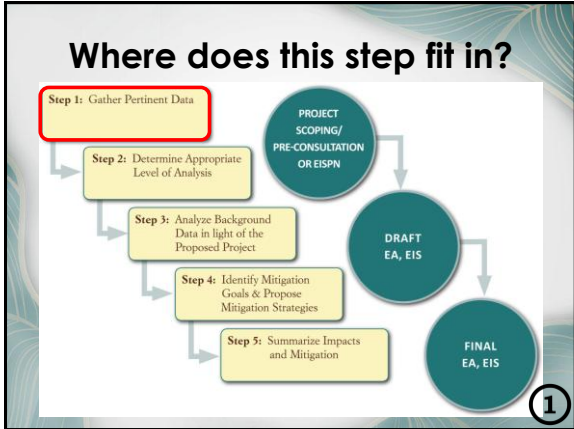
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### Step 1: Gather pertinent data

“How much and where does the water flow?” (hydrology)

“What are the potential sources of water pollutants?” (“stressors”)

“How resilient are the down gradient resources to pollutants?” (“sensitivity”)

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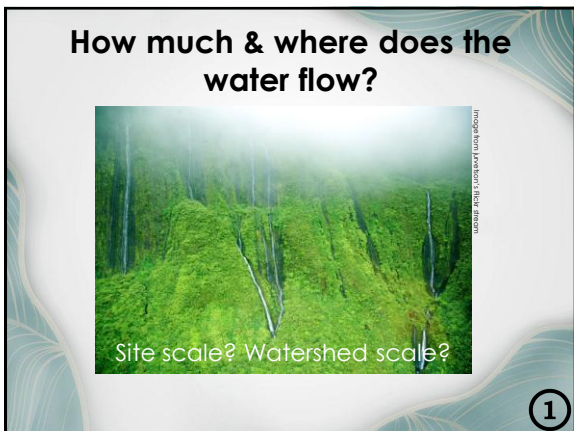
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### What are the potential sources of water pollutants?



Site scale? Watershed scale?

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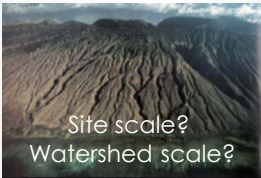
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### How resilient are the down gradient resources to pollutants?



Site scale?  
Watershed scale?

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### Stormwater BMPs on Maui

These standards shall establish controls on the **timing and rate of discharge** of stormwater runoff to **reduce** stormwater runoff pollution to the **maximum extent practicable** through the implementation of **best management practices** and **engineering control facilities** designed to reduce the generation of pollutants.

Department of Public Works Title MC-15 Chapter 111  
"Rules for the Design of Storm Water Treatment Best Management Practices"  
§15-111-2

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### Minimum Requirements

>1 acre

Meet specific criteria for sizing of stormwater facilities

<1 acre

Subject to approval of site-specific BMP plan

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### Minimum Requirements

- Water quality facilities → privately owned
- Parks may be used
- Applicants must submit maintenance plan



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### Stormwater Quality Standards

- Criteria for sizing facilities
- Management practices to meet criteria
- Water quality design standards
  - Detention based
  - Flow through based



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### Criteria for Sizing Facilities

1. Detaining stormwater for length of time that allows pollutants to settle
2. Use of filtration or infiltration methods
3. Short-term detention with a flow-through based treatment system
4. Upstream flow-through treatment and detention
5. Other, if certified that:
  - a. Avg. TSS ↓ by 80%
  - b. Post-development TSS no greater than pre-development TSS

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### Management practices to meet criteria

- Detention based controls
- Flow-through based controls
- Short-term detention facilities
- Flow-through system upstream from detention based treatment

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### Water quality design standards

Detention based

- Wet ponds
- Dry extended detention ponds
- Combination wet and extended detention ponds
- Stormwater marsh

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### Water quality design standards

Flow-through based

- Filtering facilities
  - Vegetated swales
  - Sand and peat filters
  - Commercial filters
  - Infiltration facilities

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### Maui County Grading Permits

**All grading activities** shall provide minimum BMPs to MEP. It shall be the permittee's and the property owner's responsibility to ensure that the BMPs are satisfactorily implemented.

*Maui County Code §20.08.035*

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### Maui County Grading Permits

- Exclusions to permit (MCC §20.08.030)
- Erosion & sediment control measures (MCC §20.08.180-250)
  - Horizontal terraces or benches
  - Cut slopes
  - Fill slopes
  - Distance from property line
  - Fill materials
  - Preparation of ground surface
  - Removal of vegetation
  - Grading report

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### Minimum BMPs

MCC §20.08.035

- Drainage
- Dust control
- Vegetation
- Erosion controls
- Sediment control
- Material & waste management
- Timing of control measure implementation
- No use of soil as fill within shoreline area
- No grading of coastal dune
- Sand blocking outlet may be removed\*

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### Exclusions to Permit

MCC §20.08.030

- **Emergency operations** for the protection of the general public and community
- Mining or quarrying operations
- Land management that can be shown to be in conformance with standards set forth by the **soil and water conservation districts** and in accordance with an **actively pursued comprehensive conservation program**

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### EXERCISE – STEP 1

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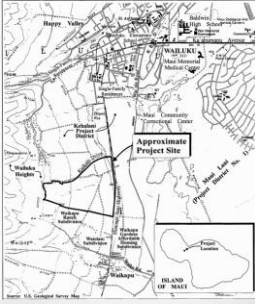
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### Maui Site X



Site = 208 acres Watershed = 14,479 acres

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### Maui Site X



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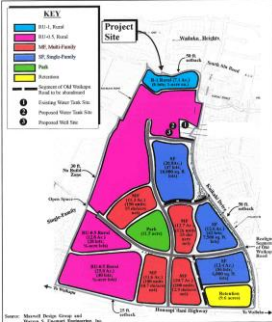
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### Maui Site X



- 127 rural half-acre lots
- 6 rural one-acre lots
- 145 single-family residential
- 476 multi-family units
- 11.5 acre park

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### Step 1 – Hydrology

How much & where does the water flow?

Existing land use/cover:



North

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### Step 1 – Hydrology

How much & where does the water flow?

Soil type:



North

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**Step 1 – Hydrology**  
*How much & where does the water flow?*  
**Drainage pattern:**



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**Step 1 – Hydrology**  
*How much & where does the water flow?*  
**Wetlands or embayments on site?**



**Receiving waterbodies:**

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**Step 1 – Hydrology**  
*How much & where does the water flow?*  
**Slope & topography:**



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### Step 1 – Hydrology

*How much & where does the water flow?*



**Flooding hazard:**

**Annual rainfall and seasonal distribution:**



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### Step 1 – Hydrology

*How much & where does the water flow?*



**State LUD:** Agricultural\*

**Community Plan:**  
Agriculture & Single-family

**Zoning:** Agricultural

**Aquifer:** lao aquifer

**Existing infrastructure:**  
Culvert at Honoapiilani Hwy



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### Step 1 – Stressors

*What are the potential sources of water pollutants?*



**303(d) waterbodies?**

Nearby lao Stream

**TMDL?**

No

**Waterbody classification:**

- Inland waters - Class 2
- Marine waters – Class A



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## Step 1 – Sensitivity

How resilient are down gradient resources to pollutants?



### Potentially impacted resources:

- Aquatic?
- Riparian?
- Cultural?
- Recreational?
- Agricultural Demand?



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## Step 1 – Sensitivity

How resilient are down gradient resources to pollutants?



### Management considerations:

- Marine reserves, MPAs?
- Subject to Maui WQ standards?
- Subject to NPDES Permit?
- Subject to County Grading Permit?
- Hawaii Coral Reef Strategy/Local Action Strategy Priority site?
- Presence of threatened or endangered species?



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## Five-Step Framework

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## Step 2: Determine appropriate level of analysis

**Objective:** Determine what level of analysis is sufficient to give stormwater concerns appropriate consideration in the planning phase.

**Methodology:** Stormwater volume generated on site. Does the stressors + sensitivity + intensity = need for an estimate of volume of pollutants?

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## Where does this step fit in?



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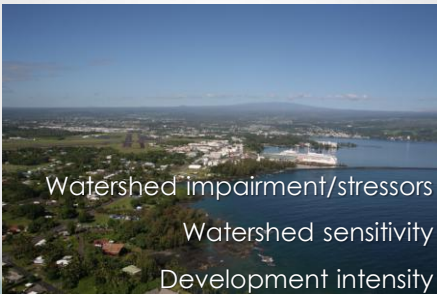
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## Analysis Considerations



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**EXERCISE – STEP 2**

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**Step 2 – Watershed Impairment/Stressors**

Has a TMDL been established for any stream segment in the sub-watershed or for the receiving waterbody?

Is there an impaired stream or waterbody in the sub-watershed that is classified as category 5 under §303(d) of the Clean Water Act?



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**Step 2 – Watershed Impairment/Stressors**

Is there an impaired stream or waterbody in the sub-watershed that is classified as category 4a, 4b, 4c, or 3 under §303(d) of the Clean Water Act?



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### Step 2 – Watershed Sensitivity

Is the receiving waterbody:

- Designated Class 1 or Class AA?
- Subject to Hawaii's Local Action Strategy to Address Land Based Pollution Threats to Coral Reefs?
- Identified as sensitive on Hawaii Watershed Priority Project?



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### Step 2 – Watershed Sensitivity

Do site conditions or combination of site conditions lend themselves to excessive runoff?

Is the site subject to the Maui County water quality standards?



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### Step 2 – Development Intensity

Is the site located in a small urban watershed or sub-watershed (measuring no more than 1 square mile in area and anywhere between 25% and 100% impervious surfaces)?



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### Step 2 – Development Intensity

Is the action subject to an NPDES permit?

Is LEED® certification desired?

Is the action subject to a County Grading, Grubbing, Tree removal or Erosion and Sediment Control Permit?



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### Step 2 – Based on information collected, what is an appropriate level of analysis?



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### Five-Step Framework

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### Step 3: Analyze background information in light of the proposed action

- 3a. Analyze primary (direct) impacts at the project scale
- 3b. Secondary impacts (offsite, down gradient)
- 3c. Cumulative impacts

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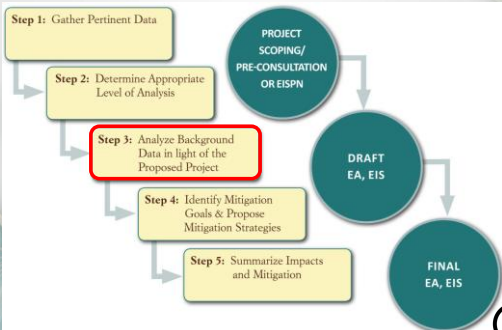
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### Where does this step fit in?



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### Step 3a: Primary impacts

**Objective:** Discuss impacts & proposed mitigation during construction.

Discuss anticipated direct impacts from the proposed action



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### Step 3a: Primary impacts

- Construction impacts
  - NPDES permit?
  - Grading permit?
- Pre- vs. Post-development
- Long-term impacts



Image source: www.bluewaterballmore.org

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### Step 3b: Secondary impacts

**Objective:** The analysis of secondary impacts should assess:

- Potential for down gradient flooding
- Impacts to down gradient sensitive resources



Image source: NOAA Restoration Center

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### Step 3c: Cumulative impacts

**Objective:** The analysis of cumulative impacts should assess the impacts on sensitive resources from all parts of the watershed relative to existing conditions and potential buildout.



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### Step 3c: Cumulative impacts

**Methodology:** Minimum planning-level assessment

- Assess existing status of sensitive resources
  - Discuss past actions
  - Discuss present actions
  - Discuss reasonably foreseeable future impacts

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### Step 3c: Cumulative impacts

**Methodology:** Small, urban watershed assessment

- Assess existing buildout relative to potential buildout
  - Existing impervious area
  - State LUD "Urban" as indicator of future imperviousness



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### Step 3c: Cumulative impacts

**Methodology:** Watershed modeling for unique circumstances

- Necessity determined in Step 2
- Review for appropriate calculations and summarized results

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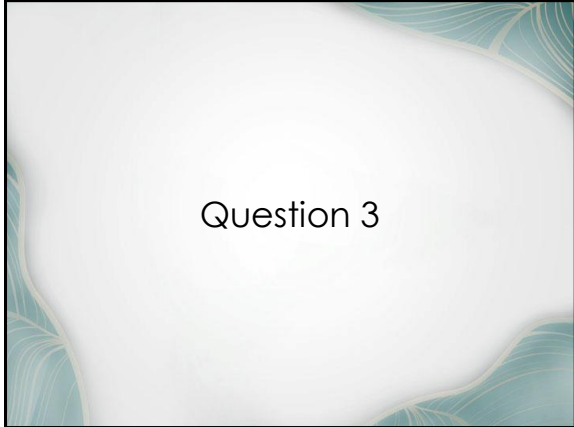
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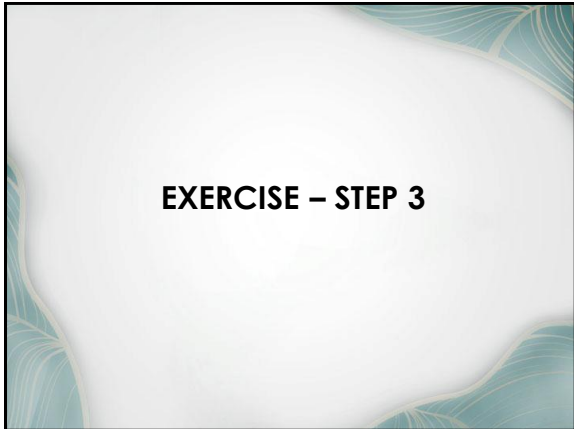
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### Step 4: Identify mitigation goals & propose mitigation strategies

**Objective:** Integrate the primary, secondary, and cumulative impacts to determine the desired extent of mitigation, while considering site and watershed conditions to formulate mitigation strategies.



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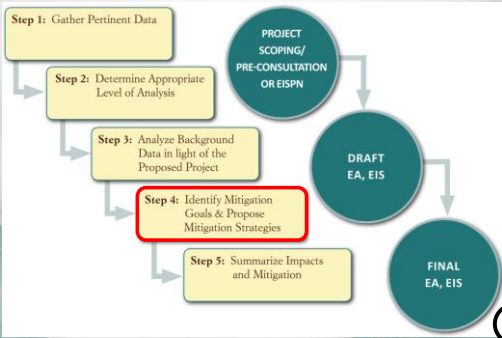
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### Where does this step fit in?



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### Identify mitigation goals

- Robust enough to support a FONSI
- Anticipate required permits
- Acknowledge role of engineering in design development

***Clear in concept, but not overly prescriptive!***

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## Identify mitigation goals

### Mitigation performance criteria

- Maximum extent practicable
- Best available technology
- Range of outcomes – what is the desired level of resource protection?
  - Minimize to maximum extent?
  - Net reduction?
  - No net increase cumulatively?
  - Net cumulative reduction?

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## Identify mitigation goals



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## Identify mitigation goals



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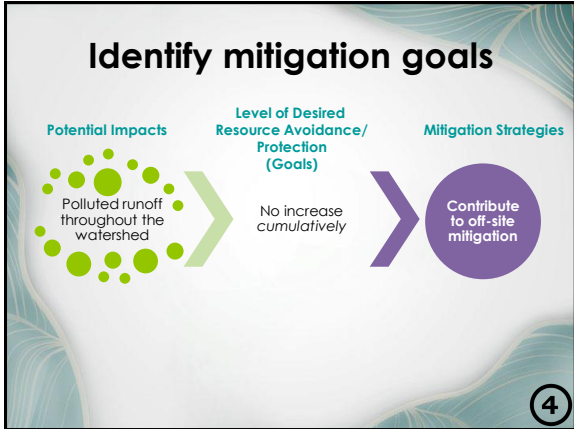
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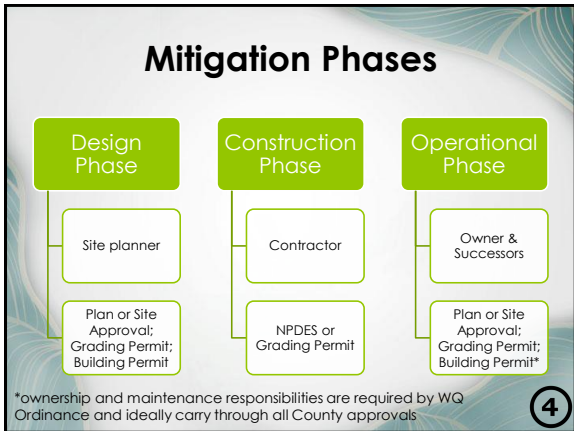
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Question 4

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## BMP Strategy Considerations

- Low Impact Development Concepts
- LEED® Standards
- Innovative
- Permanent vs. Temporary



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## EXERCISE – STEP 4

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## Five-Step Framework

1. Gather pertinent data
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
4. Identify mitigation goals & propose mitigation concepts

**5. Summarize impacts & mitigation**

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### Step 5: Summarize impacts & mitigation applicable to project

**Objective:** Documentation of impacts, mitigation measures and their projected results.

**Methodology:** The Draft EA or EIS should summarize all anticipated impacts as described in HAR §200-11 (I.) as well as proposed mitigation strategy as described in HAR §200-11 (M.)

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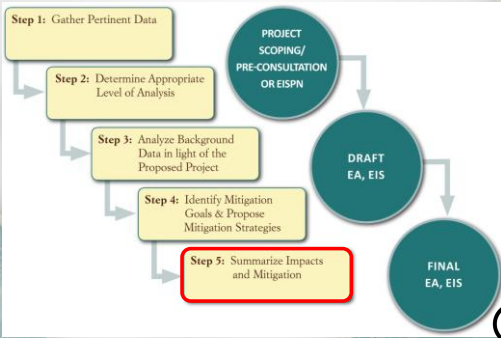
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### Where does this step fit in?



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### Reviewer's Checklist Exercise

- Using the Reviewer's Checklist in Appendix C, analyze the provided example for completeness of information, analysis and mitigation goals.

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## Conclusion

Time for questions or comments

MAHALO!

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The Guidance Document and Training  
prepared for the Hawaii Office of Planning,  
Coastal Zone Management Program by:



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