


# Stormwater Impact Assessments

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

## TRAINING

June 3, 2013  
West Hawaii Civic Center

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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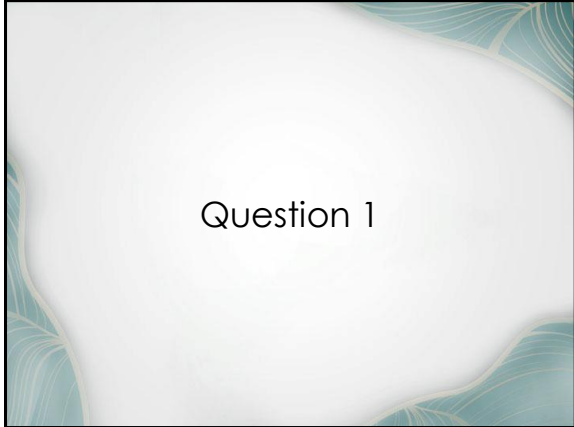
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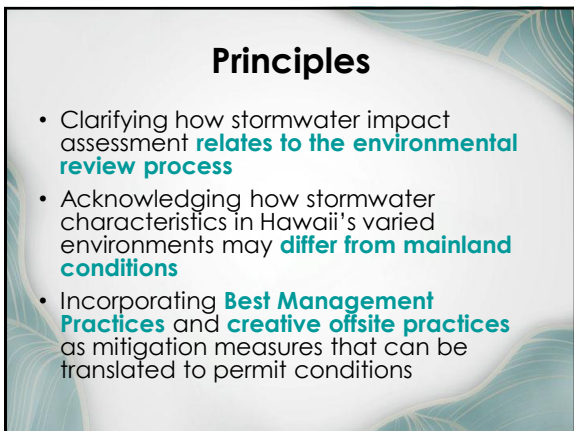
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## Primary & Secondary Impacts

### 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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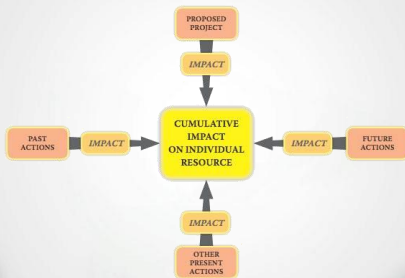
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## Cumulative Impacts



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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 §226-109)
- 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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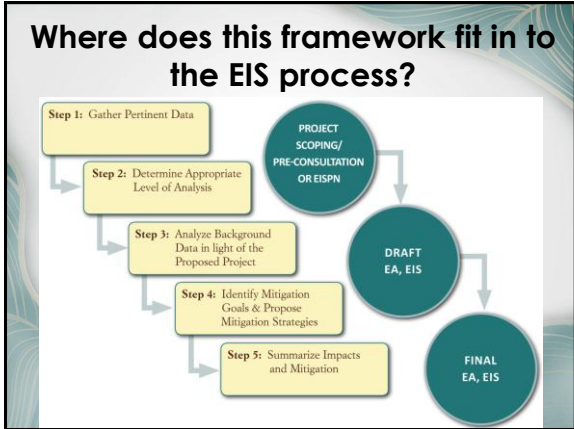
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- ### Five-Step Framework
1. Gather pertinent data
  2. Determine appropriate level of analysis
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### Step 1: Gather pertinent data

**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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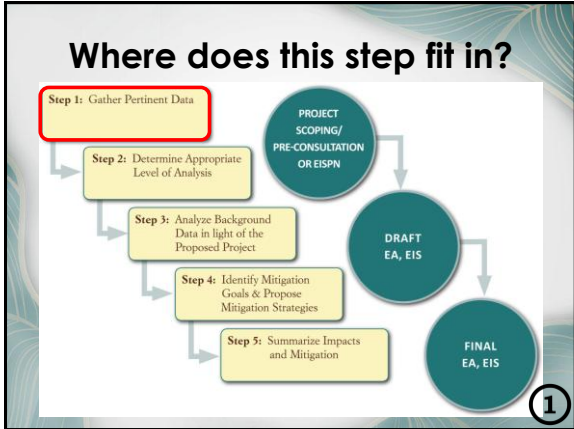
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### Step 1: Gather pertinent data

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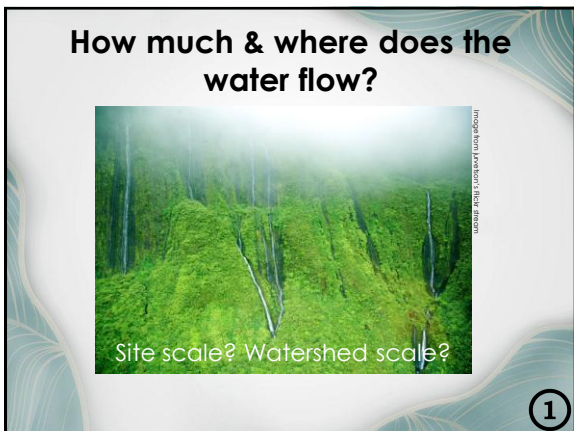
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### What are the potential sources of water pollutants?



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



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### Hawaii County Grading Permits

Hawaii County Code Chapter 10

- Exclusions to permit (HCC §10-3)
- Erosion & sediment control measures (HCC §10-18→10-23)
  - Height
  - Cut slopes
  - Fill slopes
  - Distance from property line
  - Area opened
  - Fill material
  - Preparation of ground surface
  - Placement & compaction
  - Vegetation
  - Drainage provisions

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### Exclusions to Permit

HCC §10-3

- Mining or quarrying operations
- Basements, footings, etc. of building authorized by **valid permit**
- Individual cemetery plots
- Sanitary filling and operation of **dumps**
- Exploratory excavations < 50 yd<sup>3</sup>

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### Exclusions to Permit

HCC §10-3

- Agricultural operations in conformance with soil conservation practices and in accordance with an **actively pursued comprehensive conservation program**
- Trenching & backfilling for **utility and drainage conduits**
- Clearing, excavation, and filling req'd for installation of pole lines

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### Limited Exclusion to Permit

HCC §10-3(6) & (7)

- Excavation or fill < 100 yd<sup>3</sup> and < 5 ft. **vertical height** at its highest/deepest point
  - Must follow cut slopes/fill slopes and distance to property line requirements

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### EXERCISE – STEP 1

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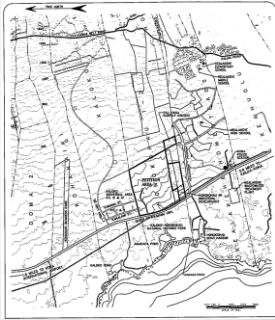
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### Kona Site X



Site = 336 acres    Watershed = 9,545 acres

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### Kona Site X



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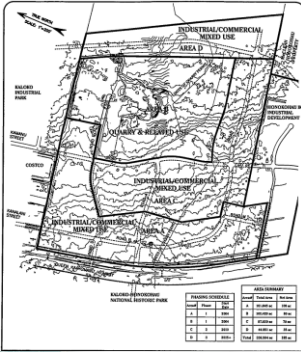
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## Kona Site X



- Business park
- Industrial development
- Quarry (for 20 more years)
- Three Phases 2002-2020

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## Step 1 – Hydrology

How much & where does the water flow?



Existing land use/cover:

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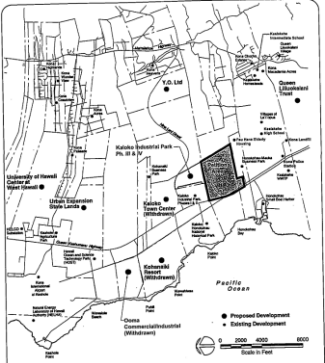
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## Proposed Land Uses in Region




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### Step 1 – Hydrology

*How much & where does the water flow?*



**Soil type:**

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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?**

**Receiving waterbodies:**

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### Step 1 – Hydrology

*How much & where does the water flow?*



**Slope & topography:**

- Gently sloping
- 40 feet above sea level to 320 feet at mauka border

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### Step 1 – Hydrology

*How much & where does the water flow?*



**Flooding hazard:**

- FIRM Zone X
- Community flood insurance study – moderate or minimal hazard

**Annual rainfall and seasonal distribution:**

- 15-20-inches per year
- 1.63-inches per hour for 10-year storm
- 2.02 inches per hour for 50-year storm
- Mostly during winter storm season

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### Step 1 – Hydrology

*How much & where does the water flow?*



**Evapotranspiration & interception:**

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## Step 1 – Hydrology

*How much & where does the water flow?*



**State LUD:** Conservation  
**County General Plan:** Industrial & Urban Expansion  
**Zoning:** Open  
**Aquifer:** Thin, brackish, slow moving basal lens in contact with saline water  
**Existing infrastructure:** None



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## Step 1 – Stressors

*What are the potential sources of water pollutants?*



**303(d) waterbodies?** No.  
**Waterbody classification:**

- Inland waters - Class 2
- Marine waters – Class AA



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## Step 1 – Sensitivity

*How resilient are down gradient resources to pollutants?*



**Potentially impacted resources:**

- Aquatic?
- Riparian?
- Cultural?
- Recreational?
- Ag demand?
- Aquifer?



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## Step 1 – Sensitivity

*How resilient are down gradient resources to pollutants?*



### Management considerations:

- Marine Reserves or MPAs?
- State WQ standards?
- NPDES Permit?
- Presence of Threatened or Endangered species?

(consider site and watershed)




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## Five-Step Framework

1. Gather pertinent data
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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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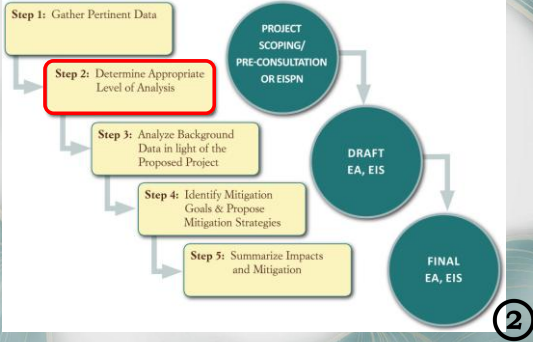
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## Where does this step fit in?



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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 Hawai'i's Local Action Strategy to Address Land Based Pollution Threats to Coral Reefs?
- Identified as sensitive on Hawai'i Watershed Priority Project?

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### Step 2 – Watershed Sensitivity

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

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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 – Summary

- Sufficient to prepare for applicable NPDES and grading req's
- Using existing data and knowledge of the proposed action, document possible pollutant inputs. If potential pollutants inputs are expected to directly impact Class I or Class AA waters, consider an analysis that estimates the pre- and post-development runoff volume and volume of pollutants in the runoff pre- and post-development.



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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**
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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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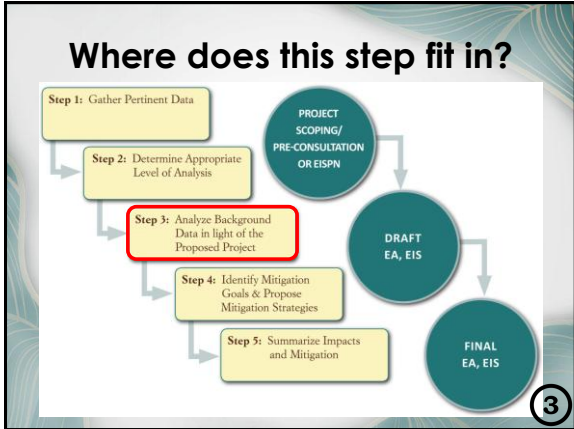
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### Step 3a: Primary impacts

**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

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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



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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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Question 3

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## EXERCISE – STEP 3

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- ### Five-Step Framework
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  - 4. Identify mitigation goals & propose mitigation concepts**
  5. Summarize impacts & mitigation

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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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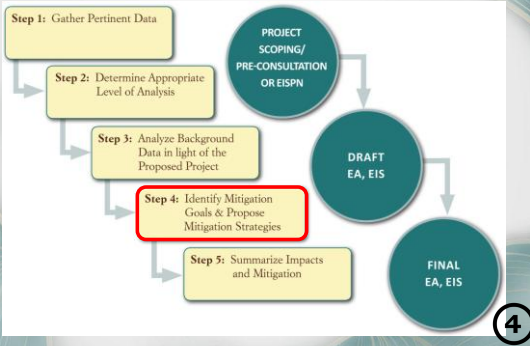
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## Where does this step fit in?



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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

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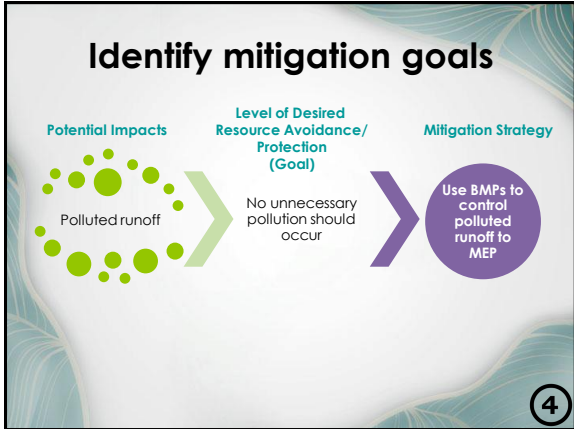
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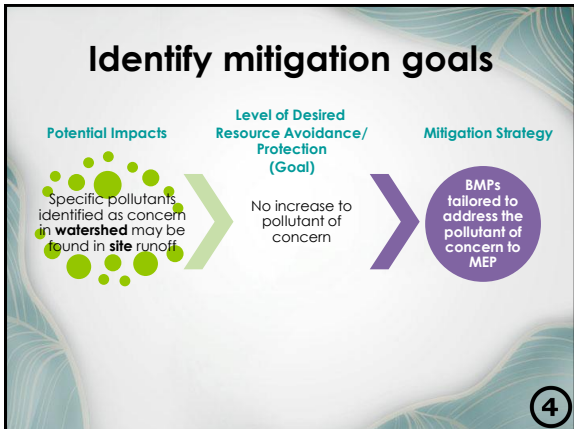
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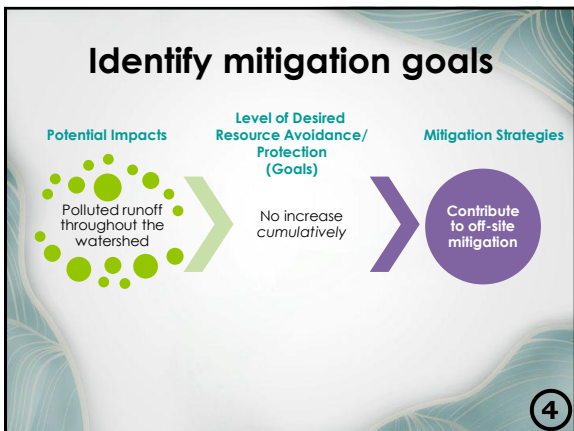
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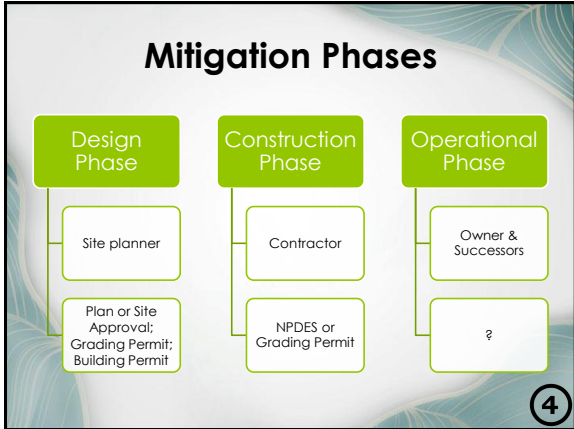
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Question 4

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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
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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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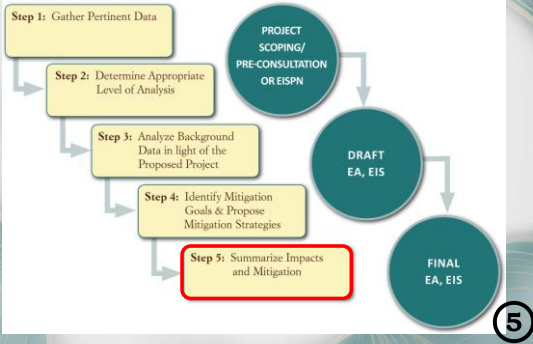
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### Where does this step fit in?



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### Reviewer's Checklist Exercise

- Using the Reviewer's Checklist in Appendix C, analyze the provided example for completeness.

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### Thank you!

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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