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Integration of the Natural Infrastructure Assessment into Air Force Basing Decision Analysis



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10 May 2011

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Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 10 MAY 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE Integration of the Natural Infrastructure Assessment into Air Force Basing Decision Analysis				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Center for Engineering and the Environment ,2261 Hughes Ave,Lackland AFB,TX,78236-9853				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Presented at the NDIA Environment, Energy Security & Sustainability (E2S2) Symposium & Exhibition held 9-12 May 2011 in New Orleans, LA.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 27	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



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Overview

■ **Natural Infrastructure Assessment (NIA)**

- Elements
- Application (original)
- Methodology
- Measures
- Rating Examples
- New Applications

■ **Enterprise Wide Look (EWL)**

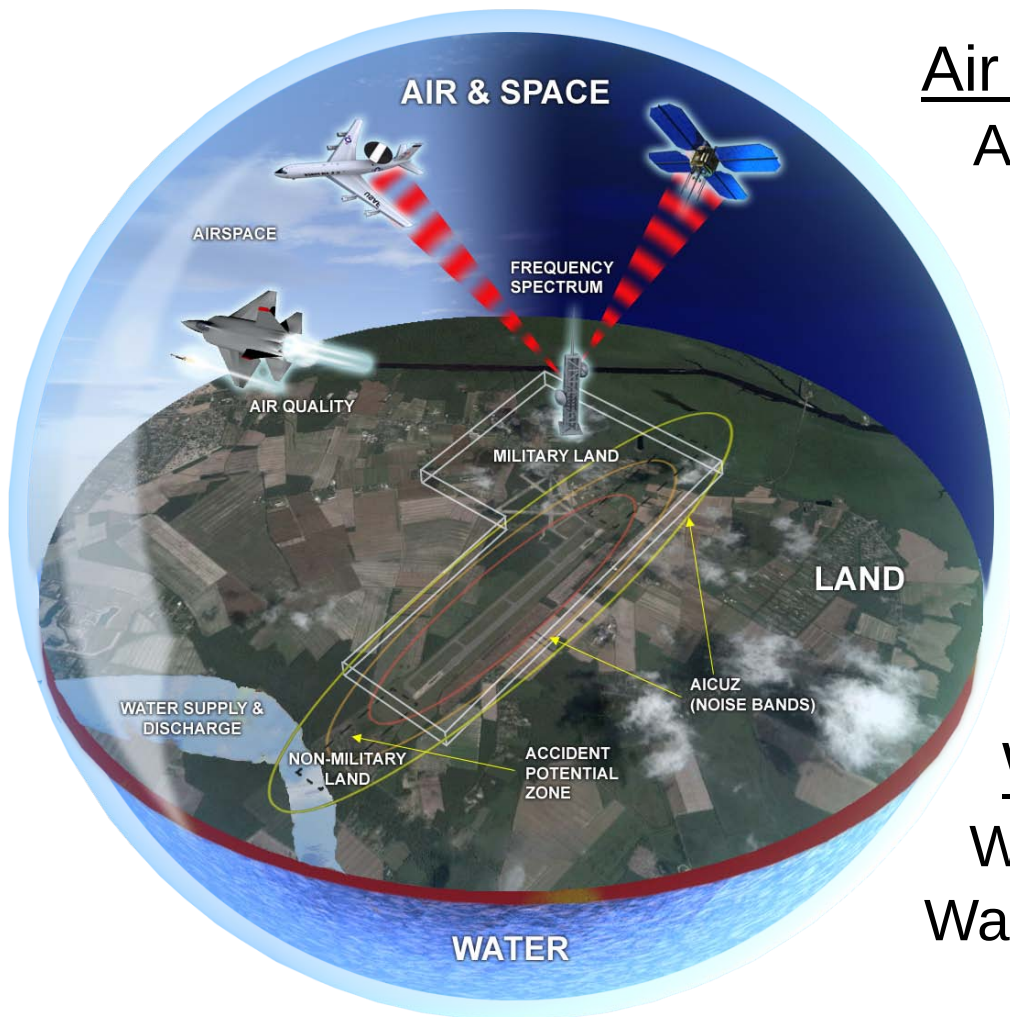
- Defined
- NIA Applicability

■ **Ultimate goal**



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Natural Infrastructure Elements



Air and Space

Air Quality

Airspace

Frequency Spectrum

Land

Military

Non-Military

Water

Water Supply

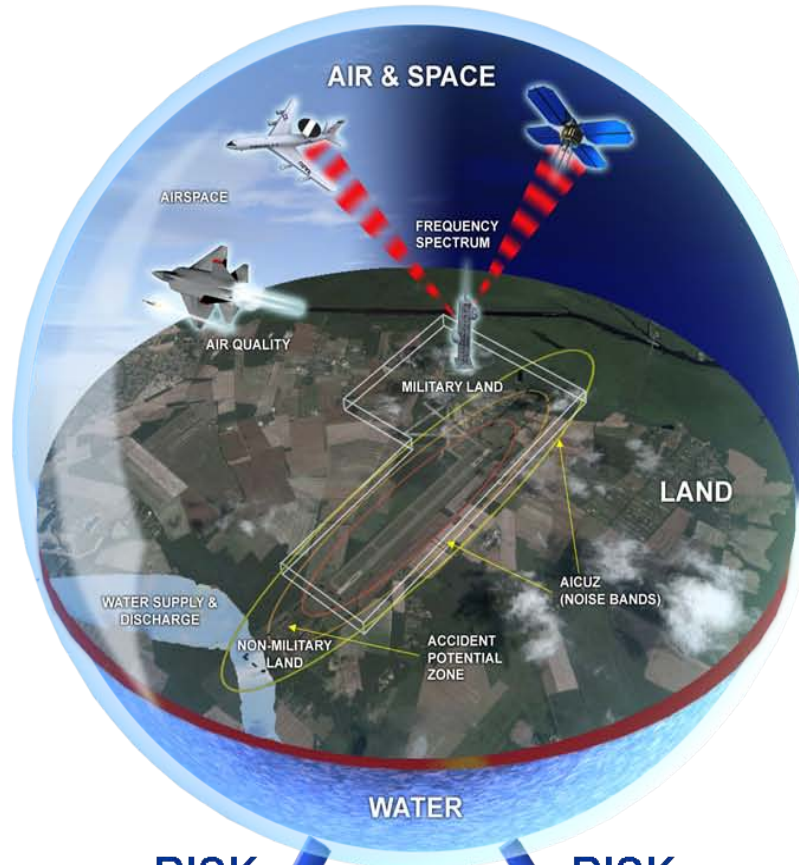
Water Discharge



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Encroachment Pressures On Natural Infrastructure

- Contiguous Development
- Air Quality Restrictions
- Airspace Restrictions
- Competing Water Demands
- Land Use Control Issues



- Cultural Resources
- Community Concerns
- Endangered Species
- Noise Restrictions

RISK

Operational

RISK

Financial

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Original NIA Application

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- **NIA identifies opportunities and deficiencies in the natural infrastructure of an installation and region**
 - Quantify adequacy of natural resources to support mission
 - Manage natural assets for current or future use
 - Understand operational and financial costs of workarounds
 - Include resource readiness ratings in readiness reporting systems to provide visibility to leadership
 - Mitigate resource deficiencies
 - Allows for trend analysis

- **A Check in the EMS PDCA Cycle**
 - Finds the areas of concern (multi-level)
 - Starts asking “why” so we can formulate a solution
 - Breaks traditional stovepipes: a lot of NIA solutions are not “environmental” solutions



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Methodology

Establish Cross Functional Team

1. Determine Mission Requirements
2. Determine Corresponding Resource Requirements
3. Determine Resource Availability

Logs & Annual Reports

Geospatial Data

Studies and Planning Documents

Emerging and Legacy Data Systems

Permits

4. Compare Resource Requirements with Resource Availability for Each Natural Infrastructure Category:

Air & Space

- Airspace
- Air Quality
- Frequency Spectrum

Land

- Military Training Land
- Non-military Land
- AICUZ

Water

- Water Supply
- Water Discharge

5. Natural Resource Capability Ratings:

N-0 – Resource is capable of fully supporting the current mission of assigned units, organizations, and tenants with no work-arounds and offers additional capacity to meet potential future mission.

N-1 – Resource is capable of supporting the current mission of assigned units, organizations, and tenants with no work-arounds.

N-2 – Resource is capable of supporting the current mission of assigned units, organizations, and tenants with minimal work-arounds.

N-3 – Resource capability presents a challenge for supporting the current mission of assigned units, organizations, and tenants due to moderate work-arounds.

N-4 – Resource capability presents significant challenges for supporting the current mission of assigned units, organizations, and tenants due to significant work-arounds.



Air and Space Measures

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Airspace

- Airfield Accessible Volume
- Military Airspace Accessible Volume
- Distance

Air Quality

- Regulatory Environment
- Stationary Source Emissions Capacity
- Mobile Source Emissions Capacity (Data Collection)
- GHG Emissions (Data Collection)

Frequency Spectrum

- Mission Requirements
- Regional Congestion (Data Collection)



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Land Measures

Military Land

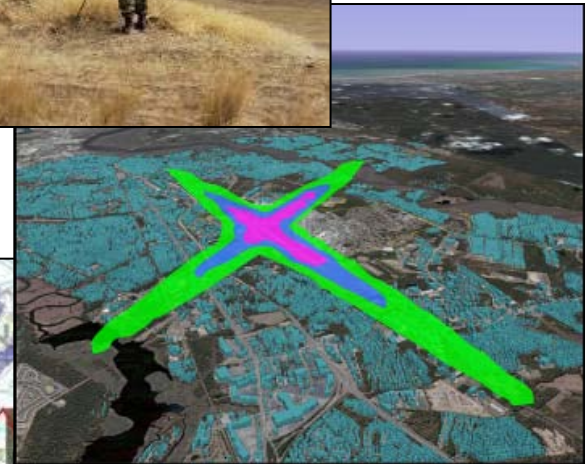
- TTA Mission Requirements - Area
- TTA Mission Requirements – Time
- Developable acres/Constrained acres

Non Military Land

- QD Arcs, Weapon Safety Footprint, Surface Danger Zone (Data Collection)

AICUZ

- Clear Zones, APZs, Noise Zones (Data Collection)





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Water Measures

Water Supply

- Water supply system capacity
- Water supply source trend
- Water supply quality

Water Discharge

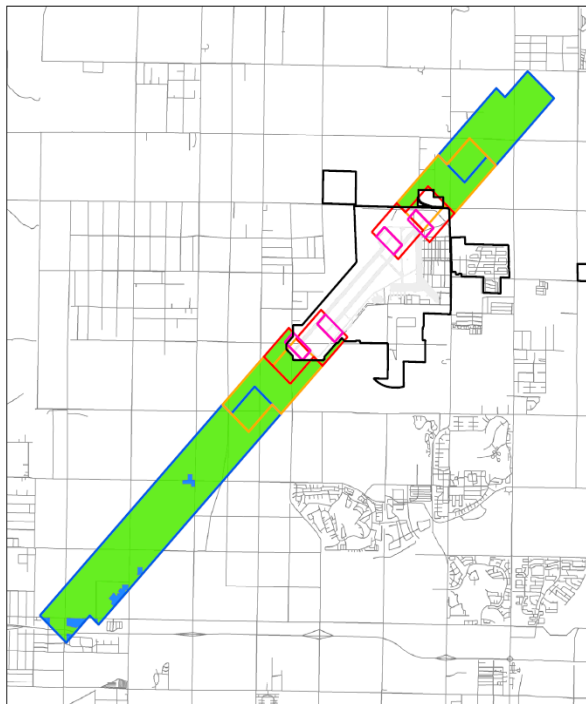
- Storm water discharge capacity
- Storm water discharge quality
- Storm water receiving body quality
- Wastewater discharge capacity
- Wastewater discharge quality
- Wastewater receiving body quality



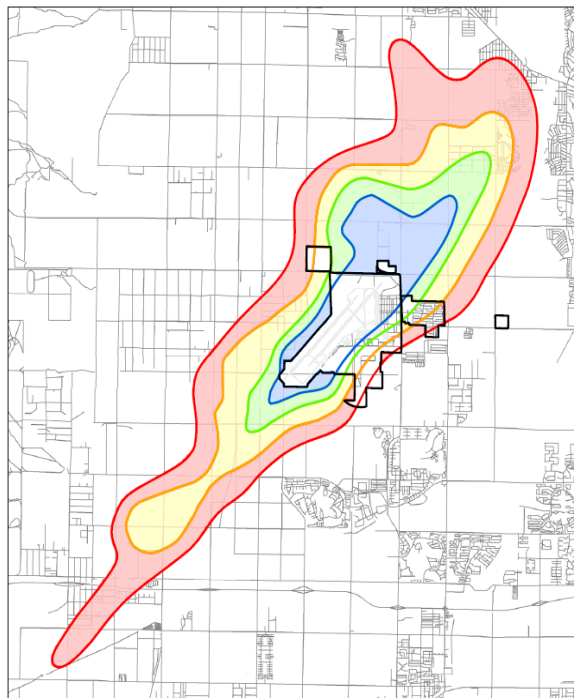


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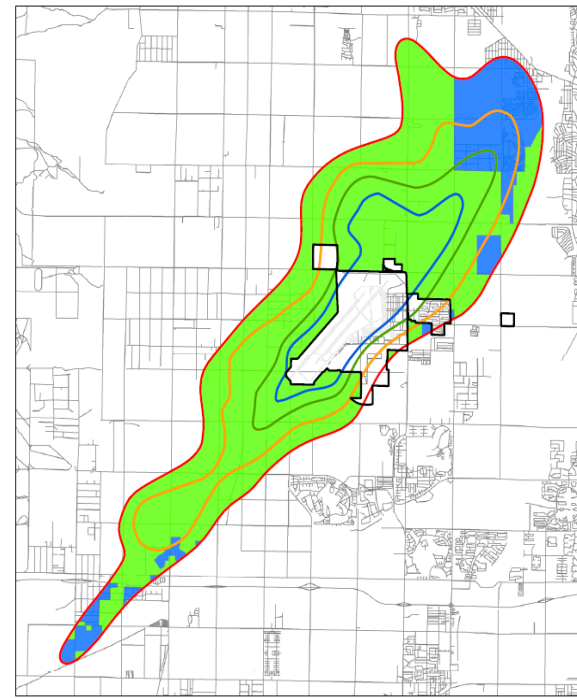
Off-Base Land Compatibility



Accident potential
zone



Noise level



Compatible acres



	KEE	LAK	RAN	LUK	SHP	TYN	VAN	MAX	COL	LAU	ALT	BMGR
% off site land incompatible	38%	37%	17%	16%	12%	8%	7%	3%	2%	~0%	0%	0%
Acres of incompatible land	322	5399	962	3180	1217	37	807	93	140	22	0	0

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AMC Rollup

Resource Category/Measure	Chick	Clinton	Ellsworth	Griffiss	Lt. Scott	MacDill	McConnell	McGuire	Pope	Scott	Travis
Airspace											
Airfield Accessible Volume	N-1	N-1	N-2	N-1	N-1	N-3	N-1	N-1	N-1	N-1	N-1
Military Airspace Accessible Volume	N-1	N-1	N/A	N-1	N-1	N/A	N-1	N-1	N/A	N/A	N-1
Distance	N-1 ¹	N-1	N/A	N-2 ¹	N-1	N/A	N-1	N-2 ¹	N/A	N/A	N-2 ¹
Air Quality											
Air Quality Rollup	N-0 ³	N-1	N-0 ³	N-0 ³	N-1 ⁴	N-0 ³	N-0	N-1 ³	N-1 ³	N-1	N-1
Frequency Spectrum											
Frequency Spectrum Operational Requirements	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1
Land											
TTA Operational Requirements - Area	N-2 ¹	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-3 ¹	N-2 ¹
TTA Operational Requirements – Time	N-1	N-1	N-0	N-0 ³	N-1	N-0	N-0	N-1	N-0	N-1	N-0
TTA Operational Requirements – Time Access Denied	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0

Overlap with Tampa International

Long Distances to several ASUs

Undersized Training Areas (new missions)



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AMC Rollup Continued

Resource Category/Measure	Charleston	Dover	Fairchild	Grand Forks	Little Rock	MacDill	McConnell	McGuire	Pope	Scott	Travis
Water Supply/Discharge											
Water Supply Source – Average Demand	N-0 ³	N-0 ³	N-0 ³	N-0	N-0	N-0 ³	N-0	N-0 ³	N-0	N-0 ³	N-0
Water Supply Source – Peak Demand	N-0 ³	N-0 ³	N-1 ^{1,2,3}	N-0 ³	N-0	N-0 ³	N-0 ³	N-0	N-0	N-0 ³	N-0
Water Supply System – Average Demand	N-0 ³	N-0 ³	N-0 ³	N-0	N-0	N-0	N-0	N-0 ³	N-0	N-0 ³	N-0 ³
Water Supply System – Peak Demand	N-0	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0	N-0 ³	N-0 ³
Water Supply Quality - Current	N-1 ³	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1
Water Supply Quality - Future	N-1 ³	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1
Storm Water Discharge Capacity	N-1 ³	N-1	N-1 ³	N-1	N-1	N-3	N-1	N-1	N-2	N-4	N-3
Storm Water Discharge Quality	N/A	N/A	N/A	N/A	N/A	N/A	N-0	N/A	N-0	N-0	N-1 ¹
Storm Water Receiving Body Quality - Current	N-2 ³	N-2	N-1 ³	N-1	N-1	N-2	N-2	N-1	N-2	N-1	N-1
Storm Water Receiving Body Quality – Future	N-2 ³	N-2	N-1 ³	N-1	N-1	N-2	N-2	N-1	N-2	N-2	N-1
Wastewater Discharge Capacity- Average	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0	N-0	N-0
Wastewater Discharge Capacity - Peak	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0 ³	N-0	N-0	N-0
Wastewater Discharge Quality	N-0 ³	N/A	N/A	N-0	N-0	N-0	N-0	N-0	N-0	N-0 ¹	N-0
Wastewater Receiving Body Quality - Current	N/A	N-2	N-2 ³	N-1	N-1	N/A	N-1	N-1	N-2	N-1	N/A
Wastewater Receiving Body Quality - Future	N/A	N-2	N-2 ³	N-1	N-1	N/A	N-1	N-1	N-2	N-2	N/A

Undersized Recreation
Area Water Supplies

Inadequate Storm

Degraded Receiving
Bodies



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ACC Water Discharge

Resource Category/Measure	Avon Park	Barksdale	Beale	Crech	Davis Monthan	Dyess	Ellsworth	Holloman	Langley	Minot	Moody	Mountain Home	Nellis	NTTR	Offutt	Seymour Johnson	Shaw	Whiteman
Water Discharge																		
Storm Water Discharge Capacity	N-2	N-2	N-1	N-1	N-3	N-1	N-2	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-1	N-2	N-1
Storm Water Discharge Quality	N-0 ¹	N-0	N-0 ¹	N/A	N/A	N-0	N-0	N-2 ¹	N/A	N-0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N-0
Storm Water Receiving Body Quality - Current	N-2	N-2	N-							N-1	N-1	N-2	N-1	N-1	N-2	N-2	N-2	N-1
Storm Water Receiving Body Quality – Future	N-2	N-2	N-							N-1	N-1	N-2	N-1	N-1	N-2	N-2	N-2	N-1
Wastewater Discharge Capacity- Average	N-0	N-0	N-0	N-4	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0	N-0
Wastewater Discharge Capacity - Peak	N-4	N-2	N-0	N-4	N-0								N-0	N-0	N-0	N-0	N-4	N-0
Wastewater Discharge Quality	N-2 ¹	N-							N-0	N-0	N-1 ¹	N-0 ¹	N-0	N/A	N/A	N/A	N-0	N-0
Wastewater Receiving Body - Current	N-2	N-2	N-1	N-1	N-1	N-							N-1	N-1	N-2	N-2	N-2	N-1
Wastewater Receiving Body - Future	N-2	N-2	N-1	N-1	N-1	N-							N-1	N-1	N-2	N-2	N-2	N-3

Inadequate Storm Drainage

Degraded Receiving Bodies

Undersized WWTP

Storm Water Infiltration



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Expanded NIA Applications

■ Current Applicability

- N-ratings (and the information behind them) create clear EMS significant aspects leading to better solutions
- Stronger AMP input clarifies levels of service and how/where we can make changes

■ Also Assists Current Mission Sustainment

- Better Sustainable Installations scoring
- Strong linkage to AFCEE's water planning provides much-needed trends and potential areas of concern
- Land use clarifies both encroachment and potential on-base development

■ Assists Future Mission Planners...



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Basing - Enterprise Wide Look (EWL)

■ Basing process often involves EWL

- All AF CONUS installations are considered for beddown
- Installation capabilities compared to SECAF approved criteria
- The following areas are often considered during EWL
 - Mission - Weather & airspace
 - Capacity - Facilities, runway, ramp space
 - Cost
 - Environmental - Air quality & encroachment
- SECAF & CSAF approve list of candidate installations
 - Site Surveys conducted – Preferred Alternative & Alternatives selected
 - SATAF(s) conducted
 - Installation selected for new mission



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NIA & Basing

NIA data can be incorporated into basing process

- Basing criteria: air quality, incompatible development (AICUZ), airspace
- Data exists at installations/MAJCOM and can be easily incorporated
- Information collected during NIAs is currently being requested from installations in basing process – NOT EFFICIENT

Site survey, SATAF, EIAP processes

- NIA data can help confirm EIAP information
- Site surveys and SATAFs assess facilities, communications, security, etc. NIA equally important

NIA can determine if bases can support a new mission

- i.e. water supply system capacity, incompatible development, air quality, etc.



NIA Measures & EWL

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NIA Measures would provide increased fidelity to EWL

- Airspace - Airspace Accessible Volume & Distance
- Air Quality - Attainment data collection & Emissions Capacity
- Land
 - AICUZ/encroachment data collection
 - Developable land
 - TTA availability and capability (ranges)
- Water
 - Water Supply/Wastewater Discharge System Capacity
 - Source Trends



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Ultimate Goal Sustainability

- Proactively planning for the future to ensure the long-term viability of the mission.
- Increased environmental analysis in basing process ensures mission sustainability
- Environmental management goal shift from preventing pollution and compliance to *sustaining our resources...*

Facilities (built environment)

Environment (natural infrastructure)

Human (workforce)



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Questions



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BACKUP

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WHAT'S NEXT?

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NIA Improvement

- **NIAs conducted over last 5 years**
 - Need to improve current measures and clarify requirements
 - Incorporate new measures
- **NIA Guide currently being updated as a result of findings and changing requirements**



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NIA Improvement

- **Provides more complete picture in Air Quality**
 - Sub-rating on measures within our control
 - Incorporates GHG emissions
- **Broadens and simplifies land measures**
 - Adds developable land availability (constrained and unconstrained)
 - Clarifies TTA measures
 - Adds TTA Capability
 - Specifies off-base land compatibility zones



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NIA Improvement

■ **Broadens and simplifies water measures**

- Consolidates supply water availability
- Adds water source trend
- Links water quality to SDWA
- Wastewater storm water discharge measures go from headroom to level of compliance
- “Future” rating eliminated from wastewater and storm water receiving body quality measure



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New NIA Measures

Air Quality	
New	Removed
Criteria Pollutant Regulatory Environment rating	Combination of reg. environment and permit headroom
Mobile Source Emissions (Data-only)	Rating on mobile sources
GHG Regulatory Environment (Data-only)	
GHG Emissions Capacity (Data-only)	
Military Land	
Developable Land (Data Only)	TTA Mission Req. (Time)
TTA Availability	Time Access Denied to TTA
TTA Mission Requirements (Capability Data)	

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New NIA Measures

Non-Military land	
New	Removed
Off Base Compatible Acres	Non-Military Land (similar data collection)
-CZs	
- APZs	
- Noise Zones	
- Weapon Danger Zones	
- Fire Safety Fans	
- Fuel Storage Buffer Zones	
Water Supply	
Water Supply Versus Average and Maximum Demand	Water Supply Source (avg and max) Water Supply System (avg and max)
Water Supply Trend	



Expanded NIA Application

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■ **Assists Future Mission Planners**

- Land measures show potential for new encroachment and on-base growth potential
- Air quality measures linked to new mission application
- TTA availability
- TTA capability
- Airspace size and distance
- Water sustainability