

# Infrastructure Future Operational Capabilities (FOC's) in Support of Corps' Business Program

## Group 3 Committee Report: Environmental



**Civil Works Hydraulic Infrastructure FOC & R&D Workshop  
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# Infrastructure Future Operational Capabilities (FOC's) in Support of Corps' Environmental Business Program

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## Committee

Byron Foster (Chair)

- Dale Munger
  - Don Yule
  - Tony Liu
  - Mike Klosterman
  - Mary Ellen Hynes
  - Al Hussaini
  - Leon Holden
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# Infrastructure - Environmental FOC's

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- **Current Environmental Research Programs**
  - **Water Quality**
  - **Ecosystem Management & Restoration**
    - wetlands
    - abandoned mine-lands
  - **Long-term Effects of Dredging Operations**  
**LEDO**

# Infrastructure - Environmental FOC's

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**HIGH**

- Environmentally friendly, sustainable flood control infrastructure
  - construction sequences, options
  - vegetation on levees and dams
  - geo-synthetics for smaller footprints
    - urban impacts
    - rural impacts

# Infrastructure - Environmental FOC's

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**HIGH**

- Environmentally friendly, sustainable criteria for environmental restoration & replacement
  - natural vs. man-made materials
  - minimum impact materials and techniques
  - in-stream construction
  - geo-synthetics for smaller footprint construction
    - urban impacts
    - rural impacts

# Infrastructure - Environmental FOC's

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**HIGH**

- Environmentally friendly and sustainable materials for construction, repair and rehabilitation
  - Recycled materials
  - Waste materials
  - Up-front costs versus life cycle costs

# Infrastructure - Environmental FOC's

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**HIGH**

- Tools to adapt to environmentally-enforced requirements of system operation
  - evaluate system response to change in use
  - techniques/materials to retrofit infrastructure components for environmental demands
  - design or repair for spillways, etc. to accommodate environmental regulations

# Infrastructure - Environmental FOC's

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**HIGH**

- Tools to adapt to environmentally-enforced requirements of system operation (continued)
  - sustainable infrastructure for environmental load/use requirements
  - accommodate change in use of structural components, e.g. spillways designed for one time use or emergency, now in near constant use

# Infrastructure - Environmental FOC's

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**HIGH**

- Subsurface site characterization for reduced uncertainty in constructed habitats
  - third dimension of site characterization
  - unseen, unknown, high uncertainty
- Regional groundwater impacts of rehab/constr. Projects
  - changes in water quality
  - surface water and subsurface water interactions

# Infrastructure - Environmental FOC's

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**HIGH**

- Eco-friendly maintenance of relief wells
  - mineral/bio fouling
  - reduce life-cycle costs

# Infrastructure - Environmental FOC's

**Medium**

- Innovative, appropriate environmentally friendly construction, repair and rehabilitation techniques
  - low-impact equipment
  - geosynthetics
  - construction season
  - construction cost trade-offs vs. environmental benefits
  - mobility of equipment in sensitive areas
  - minimize visibility & destruction
  - environmentally friendly underseepage control, cut-off walls

# Infrastructure - Environmental FOC's

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**Medium**

- Minimize environmental impacts of removing dams
  - managing erosion
  - sediment transport & deposition
  - aquatic habitats
  - engineering procedures for removal

# Infrastructure - Environmental FOC's

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**Medium**

- Design issues related to sediment management
  - dredged material disposal sites
  - geosynthetics
  - capping -offshore contaminants
  - construction and performance monitoring
  - in-situ techniques

# Infrastructure - Environmental FOC's

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**Medium**

- Risk analysis tools to quantify environmental impact of dam failure
  - not captured in consequences of dam failure
  - loss-of-life & property not enough
  - not ready for forward planning

# Infrastructure - Environmental FOC's

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**Medium**

- Mitigation procedures/tools for natural and manmade hazards to environment
  - people
  - species
  - water supply
- and infrastructure
  - landslides
  - roads
  - rock-falls

# Infrastructure - Environmental FOC's

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**Low**

- Improved geo-techniques for water supply exploration and development
  - avoid further environmental damage
  - expands support for others

(Central and South America, Mobile District)

# Infrastructure - Environmental FOC's

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**Low**

- Increased efficiency of turbines
  - use less water to produce more electricity
  - lower fish mortality
  - less water over spillway
  - faster, lower-cost H&H modeling

# Infrastructure - Environmental FOC's

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**Low**

- Integrated multidisciplinary systems analysis capability, for systems at multiple scales
  - engineering
  - material & geo-sciences
  - biological sciences
  - economics
  - risk analysis
  - unified input and delivery platform

# Infrastructure - Environmental FOC's

- Issues

- Current R&D doesn't address these FOC's
- Proposed FOC's should integrate within current infrastructure research thrusts and leverage with EQ research programs
- Awareness: Corps-wide dialog with case building
  - case for future missions ( Everglades restoration, dam removal)
- Implementation target FY03

