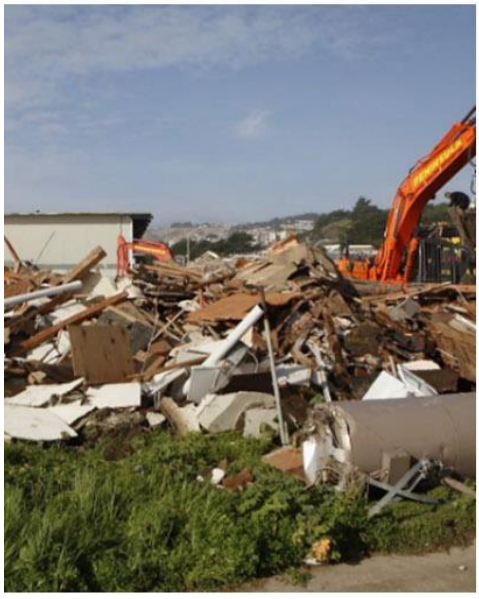
Resiliency and Natural Disaster Debris Workshop Final Summary Report



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- EPA Region 9: Timonie Hood and Richie Donahou–EPA Region 9; Nicole Haynes–Alameda County
- Contractors: Brad Spangler–Meridian Institute; Jennifer Lam, Shanika Amarakoon–Eastern Research Group, Inc.

Workshop participants and background interview experts represented:

Federal Agencies: FEMA, HUD, NOAA, GSA, USDA, Naval Facilities Engineering Systems Command Southwest, National Renewable Energy Lab (NREL), U.S. Army Corps of Engineers, Presidio Trust, EPA–Office of Environmental Justice, Office of Research and Development and Pacific Islands Office

Tribal Governments: Mille Lacs Band of Ojibwe, Saginaw Chippewa Indian Tribe, Red Cliff Band of Superior Chippewa, Sault Ste. Marie Tribe of Chippewa Indians

State Agencies: Arizona Department of Emergency and Military Affairs, Arizona Department of Environmental Quality, CalEPA, CalRecycle, California Coastal Commission, California Department of Toxic Substances Control, Hawaii Emergency, Minnesota Pollution Control Agency, Nevada Tribal Emergency Coordinating Council, Ohio EPA, Wisconsin Department of Natural Resources

Local Governments: Calumet County, WI; Chippewa County, WI; County of Alameda, CA; County of San Mateo, CA; Kenosha County Sheriff's Division of Emergency Management, WI; Indianapolis, IN; Los Angeles County Public Works, CA; San Francisco Department of the Environment, CA; San Antonio, TX; San Francisco Department of Emergency Management, CA; StopWaste, CA; Portland, OR; Saint Paul, MN; Toledo, OH; Waushara County, WI

Nongovernmental Organizations/Businesses: American Red Cross, Los Angeles Region; Bay Area Deconstruction Workgroup; California Resiliency Alliance; Climate Xchange; Development Center for Appropriate Technology; Enterprise Community Partners, Inc.; Green Advantage, Inc.; GreenLynx; Illinois State Water Survey; International Code Council; Journey Disaster Response Team; Material Reuse; National Institute of Building Sciences; Pacific Institute for Climate Solutions; Resilient Design Institute; Resource Recycling Systems; Reuse Alliance; ReUse Hawai'i; San Francisco Federal Executive Board; Resilient Design Institute; Virtual Plant Technologies, LLC; Zanker Recycling

Academic Institutions: Colorado State University, Middlebury Institute on International Studies, Rice University, University of Louisiana at Lafayette

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Resiliency and Natural Disaster Debris Workshop Final Summary Report

Executive Summary

Background

Between May and August 2021, EPA hosted virtual workshops for Region 5 and Region 9 on resiliency and natural disaster debris planning and management.

- Region 5 serves Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin and 35 Tribes
- Region 9 serves Arizona, California, Hawaii, Nevada, Pacific Islands, and 148 Tribes

VISION

Where everyone lives in a resilient world where less debris is generated and fewer resources are used to rebuild and recover.

Each regional workshop comprised virtual sessions and breakout and plenary discussions.

The workshop goals included:

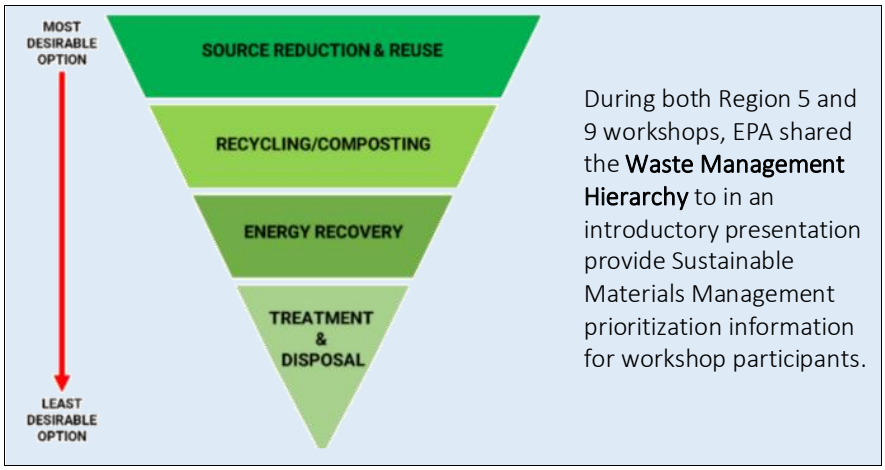
- Align the federal family, working with their state and tribal partners, across the disaster management and materials life cycles to increase resiliency and leverage resources;
- Identify gaps that prevent the alignment of disaster debris management activities and sustainable materials management practices; and
- Bring about changes in behavior by identifying practical actions to bridge the gap between current practices related to disaster debris and community resilience.

Participants represented federal, tribal, state, and local government; non-governmental organizations; academic and research institutions; associations; and consulting firms. Overall feedback was positive, and participants appreciated EPA's leadership and engagement on this issue and the opportunity to meet workshop participants from other organizations.

Workshop Agenda Topics

The main topics discussed across the two regional workshops include:

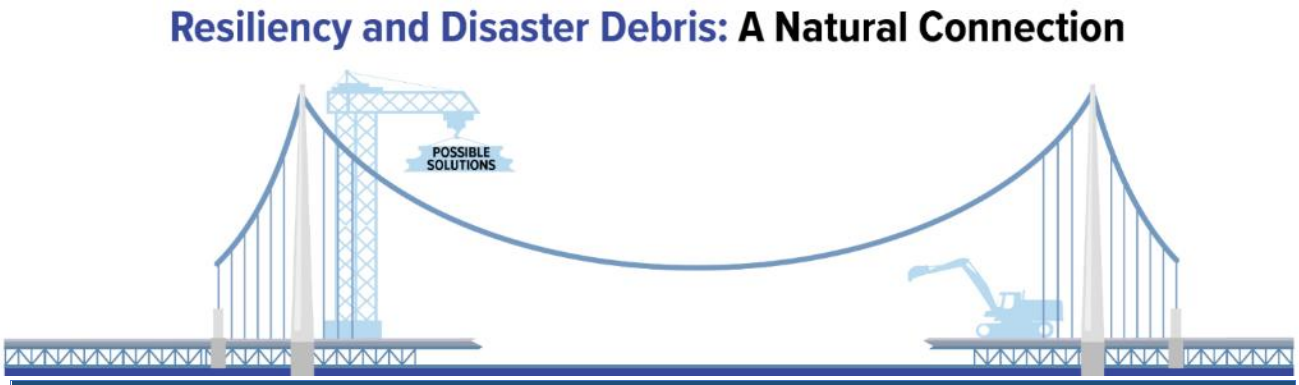
- Expansive discussion of cutting-edge view of the connection between resiliency practices and disaster debris management
- Opportunities and hurdles to advancing environmental justice and community engagement in disaster debris planning, recovery, and resilient rebuilding
- Impacts of the climate crisis on frequent and severe disasters and sea level rise
- Innovative and resilient disaster debris management practices, including planning for sea level rise; safe deconstruction, reuse, recycling, and composting; and resilient building design
- Understanding of and connections between the roles, responsibilities, and capabilities among various federal agencies in the disaster management cycle
- Opportunities and hurdles to advancing innovative and resilient disaster debris management
- Practical next steps to advance innovative and equitable disaster debris management and resilience
- Key workshop takeaways featured at an Executive Session



During both Region 5 and 9 workshops, EPA shared the **Waste Management Hierarchy** to in an introductory presentation provide Sustainable Materials Management prioritization information for workshop participants.

Follow-up Actions for Consideration

Workshop participants identified a variety of potential follow-up actions to address key gaps and advance innovative and equitable natural disaster debris management and resilience. Currently, FEMA and other federal and state agency disaster debris programs default, and in some cases require, landfill disposal of disaster debris, including abandoned buildings and buildings threatened by sea level rise. The table below highlights some key gaps and potential solutions to close them.



Identified Gaps	Potential Solutions

Funding and Incentives	• **Funding underserved communities:** Target funding to those with greatest need (e.g., communities with environmental justice concerns, Tribes, island communities).
	• **Grant funding**: Explicitly list resiliency measures, planning, deconstruction and materials reuse, recycling, and composting as eligible activities for relevant federal grants (e.g., infrastructure, mitigation, job training, etc.)
	• **Incentives**:
	  o Update federal disaster guidance to provide incentives like reimbursement for resiliency building, deconstruction, reuse, recycling, mulching, and composting
	  o Provide incentives for or support large-scale, public reuse or salvage centers in local communities - shifting from a recycling model to a reuse model
	  o Tax credits
	  o Job training funding

Policy and Guidance	• **Grant eligibility:** Change eligibility criteria for relevant federal grants (e.g., FEMA hazard mitigation and HUD Community Development Block Grants) to explicitly cover disaster debris and resilience planning and related infrastructure improvements

Identified Gaps	Potential Solutions

	• **Building Codes:** In partnership with key non-governmental standard-setting organizations (e.g., International Code Council, U.S. Green Building Council, ISO) explore federal policy changes or guidance that could drive action on resilience building and/or deconstruction practices at the local level
	• **Federal guidance:** Federal leadership and guidance is needed on:
	  ○ engaging with and reducing impacts of disaster debris in underserved communities
	  ○ methods and systems for material reuse
	  ○ integrating/aligning Hazard Mitigation Plans with Disaster Debris planning
	  ○ planning for reducing waste from buildings impacted by sea level rise
	  ○ navigating historic preservation requirements
	  ○ accounting for the influence of climate change in disaster debris planning
	  ○ opportunities to leverage and align local planning processes with federal hazard mitigation and disaster debris planning guidance
	  ○ proper/safe deconstruction methods
	  ○ certifications and how EPA can get involved in deconstruction certification, similar to EPA's lead paint certification program
	  ○ resilient, affordable housing siting, design, and management to withstand disasters

Technology, Research, and Development	• **Business case for planning and mitigation**: Conduct cost-benefit studies to assess the return on investment for resiliency planning and develop a business case for advance disaster debris planning and mitigation measures • **Pilot project**: Facilitate investment in pilot or demonstration projects on deconstruction, materials reuse, and creating markets for salvaged materials • **Showcase examples and case studies:** Publicize successful disaster debris management and resiliency strategies and efforts
Planning Resources and Information Sharing	• **Prioritize underserved communities:** Develop inclusive planning and outreach to support those most vulnerable to disasters • **Resource center**: Develop a resource hub to capture and provide access to the full range of relevant federal resources, guides, and funding opportunities pertinent to disaster debris management and resilience • **Trainings and technical assistance**: Develop trainings and technical assistance to support communities in planning for disaster debris management and resiliency • **Webinar and trainings:** Provide webinars and trainings that appeal to local governments to encourage natural disaster resilience, including planning for natural disaster debris, deconstruction, and reuse mandates
Partnerships and Coordination	• **Interagency working group**: Establish a federal interagency working group on disaster debris and resiliency to identify synergies and opportunities to strengthen coordination • **Cross-coordination:** Increase coordination with tribal, state, and local partners across jurisdictions to address similar issues together • **Partner training:** Provide training and engage with non-governmental partners

**For a full list of gaps and potential solutions, see the meeting summaries below.*

The two workshops generated a range of practical action steps the federal family can take to address existing gaps and drive innovation around disaster debris management and resilience. One key idea that clearly emerged and could be used to enhance coordination and spark action across a number of these areas, is to establish a federal interagency working group on resilient disaster debris management. Participants generally pointed to EPA and FEMA as potential joint hosts of such a group.

I. Meeting Summary

Region 5

Common Great Lakes region disasters include flooding and extreme storms.

Background

The EPA Region 5 RNDD Workshop occurred over three 2- and 3-hour virtual sessions on May 4 and 6 and May 20, 2021.[1] The workshop goals included:

- **Align the federal family, working with their state and tribal partners**, across the disaster management and materials life cycles to increase resiliency and leverage resources;
- **Identify gaps** that prevent the alignment of disaster debris management activities and sustainable materials management practices; and
- **Bring about changes in behavior** by identifying practical actions to bridge the gap between current practices related to disaster debris and community resilience.

Participants

Across the three sessions, there was an average of 50 participants (session 1 – 67 participants, session 2– 45 participants, session 3 – 38 participants). Most participants represented the federal government, followed by local, state, and tribal governments, and other key sectors (NGO, academia, private).

Discussion Highlights

Key topics of discussion during the Region 5 workshop included:

- **Opportunities to enhance federal interagency coordination around resiliency and disaster debris management**: This included a series of lightning talks highlighting opportunities for greater governmental coordination between the environmental and disaster response communities around disaster debris management before, during, and after events, along with information about relevant tools and resources.

[1] Download all Region 5 meeting recordings (.mp4) and presentations (PDF) for all 3 sessions here: https://drive.google.com/drive/folders/12Gx0X-K3JOkuHIuo95sANgNhlUbV9qEZ?usp=sharing

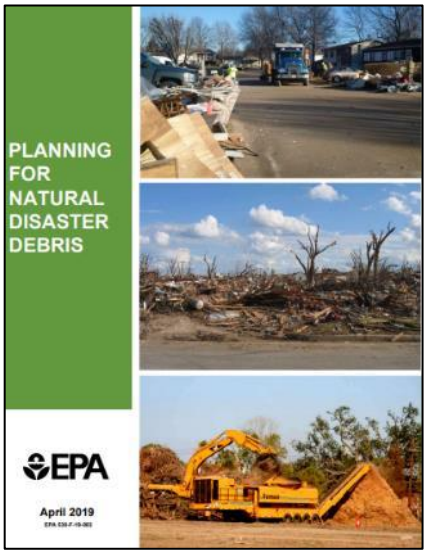
- **Federal agencies disaster debris interactive exercise**: Breakout groups worked through and discussed questions on where each agency fits in – identifying gaps, obstacles, potential solutions, and action steps. The discussion questions varied from high policy-level concerns to basic tactical-level problems.
- **Improving advance planning for natural disaster debris management and resilience**: Breakout groups identified potential solutions to address key gaps associated with advance planning for natural disaster debris management and increase community resilience. Participants thought more broadly and creatively about how to better leverage and coordinate federal programs for resiliency, mitigation, and disaster debris planning.
- **Advancing more innovative and resilient disaster debris management**: Breakout group identified ways to drive and enhance community implementation of measures to mitigate disaster impacts and minimize disaster debris while building resilience. Throughout the breakout sessions participants worked together to think broadly and creatively about how to better leverage and coordinate federal programs.

Mixed debris landfill. (Photo: Susan Vescovi)

Key Takeaways

Key takeaways from the Region 5 workshops included:

- **Streamline processes, guidance, and incentives** to help communities develop comprehensive debris management and resilience plans effectively and efficiently.
- **Conduct outreach and education** and create a resource website that spans across the Federal Agencies where all available technical assistance, grants, guidance, and draft resilience plans are available to state, local and tribal/tribal agencies.
- **Engage all stakeholders and the community** in the problem identification, factfinding, research, and solution development of disaster debris and resiliency challenges and create interagency collaboration on mitigation resources.
- **Give priority to funding pre-disaster debris planning** and provide communities with expert resources.



EPA's Guidance on Planning for Natural Disaster for Debris https://www.epa.gov/homeland-security-waste/guidance-about-planning-natural-disaster-debris

Table 1 below highlights key gaps and steps the federal family could take to close those gaps and advance resilient disaster debris management across the nation.

Table 1. Key gaps and potential solutions for resilient disaster debris management

Key Gaps
• **Lack of integration** of disaster debris planning with other community planning processes (e.g., hazard mitigation) • **Lack of data and cost-benefit analyses** around return on investments in waste management systems, resilient building practices, infrastructure, and other measures necessary to minimize disaster debris and maximize materials reuse

Key Gaps

- **Limited coordination** and streamlining of disaster debris planning processes
- **Lack of outreach and communication to local communities** on available resources to leverage
- **Lack of financial resources and incentives** for community disaster debris planning
- **Lack of understanding on what flexibility** communities have regarding FEMA reimbursement rules (e.g., traditional disposal vs other reuse options)
- **Lack of national-scale building codes**; varied local enforcement
- **Limited cultural competency** for providing planning and response assistance to Tribes
- **Lack of community-level awareness about strategies and services** to minimize generation of debris and waste
- **Limited investment** in demonstration projects (e.g., research, pilots, technologies for alternative debris management)

Potential Solutions

- **Promote existing guidance and tools** - Planning for Natural Disaster Debris Guidance (PNDD) and Disaster Debris Recovery Tool (DDRT)
- Complete research and publish results on assessing the **return on investment for resiliency planning**
- **Promote availability of funding resources** – FEMA's Public Assistance Program, HUD's Community Development Block Grant, USDA's Rural Development Water Environmental Programs
- **Develop interagency tool/curriculum** to help agencies understand each other's programs and identify opportunities for collaboration and synergy, as well as include a visual flowchart for how agency programs intersect to coordinate and streamline disaster debris planning and response
- **Forge partnerships** and engage state and tribal agencies and local organizations in disaster debris and resilience planning
- **Enhanced training** for disaster debris planning and guidance re: integration with other community planning processes; for example:
  - How to **pre-designate materials** for reuse/recycling and separate materials from wastes
  - How to **identify and establish contracts** with more diverse service providers and facilities
- Develop **debris plan templates and other tools** to help communities with planning

For specific details on 1) transformational actions the federal government could take to enhance resilience around disaster debris management, as well as 2) quick wins the federal government should pursue in the near-term to enhance resilience around disaster debris management, see the downloadable full meeting summary notes.

Proposed Actions and Next Steps to Reach Identified Goals

As part of a workshop evaluation, participants ranked the following "quick win" priorities identified during the workshop. These were ideas that emerged regarding ways in which the federal family could make progress toward the vision and goals of the workshop in the near-term. Each item includes a possible timeline for implementation.

1. **Interagency Working Group**: Establish a federal interagency working group on disaster debris and resiliency.
   - 2022: Establish steering committee for interagency working group, develop goals and objectives for working group, invite representatives to join working group.
   - 2023 – ongoing: Set quarterly meetings for interagency working group.
2. **Resource Center**: Develop a resource hub to capture and provide access to the full range of relevant federal resources, guides, and funding opportunities pertinent to disaster debris management and resilience. *(Also see Trainings and Technical Assistance below.)*
   - 2022: Identify lead agency and contact, develop plan to establish resource center, compile relevant resources and contacts for updating resources

- 2023 – ongoing: Update resource center on annual (or more frequent) basis, share news regarding resource center to wide audience.

3. Trainings and Technical Assistance: EPA and FEMA to develop joint trainings and technical assistance mechanisms to support communities in planning for disaster debris management and resiliency. *(Also see Resource Center above.)*
    - 2022: Identify lead agency and contact, develop training and technical assistance plans
    - 2023 – ongoing: Implement training and technical assistance
4. Business Case for Planning and Mitigation: Conduct cost-benefit studies to assess the return on investment for resiliency planning and develop business case for disaster debris planning and mitigation.
    - 2022-2024: Identify contractor and conduct cost-benefit assessment on the economic, social, and environmental costs associated with natural disaster debris and the benefits of planning for its management and implementing resiliency strategies and measures.
      2022-2024: Develop business case for disaster debris planning and mitigation
5. Pilot Project: Facilitate investment in pilot/demonstration projects on deconstruction, materials reuse, and creating markets for salvaged materials.
    - 2023-2024: Identify potential pilot projects for investment
    - 2025-ongoing: Invest in pilot projects

Deconstruction job training pilot projects were conducted on various types of buildings by Mercy Corps and other nonprofit organizations after Hurricane Katrina. (Photos: Brad Guy)

Region 9

Sea level rise, tropical storms, earthquakes, and wildfires impact the Pacific Southwest and Pacific Islands region. (Fire Photo: Jana Baldwin/FEMA)

Background

The EPA Region 9 RNDD Workshop occurred over three 2- and 2.25-hour virtual sessions on July 20 and 22 and August 17, 2021.[2] The workshop goals included:

- **Align the federal family, state, and tribal partners** to advance disaster debris planning, management, and policy innovation to support environmental justice and climate resilience;
- **Identify opportunities** to advance planning and policies for safe building and building materials reuse in disaster response, recovery, and other innovative policies; and
- **Change behavior by identifying practical actions** to bridge the gap between current practices related to disaster debris planning and management, environmental justice, and community resilience.

Participants

Across the three sessions, there was an average of 66 participants (session 1 – 67 participants, session 2– 62 participants, session 3 – 68 participants). Most participants represented the federal government, followed by state and local government, and other key sectors (NGO, academia, private). An additional 24 executive session attendees joined to watch and listen to key takeaways from the Region 9 workshop.

Discussion Highlights

Key topics of discussion during the Region 9 workshops included:

- **Expanding our view of disaster debris management**: The panel of session 1 speakers helped connect shared priorities of equity, environmental justice and climate resilience to disaster debris and sea level rise planning. The session 2 panel highlighted opportunities for government agencies and communities to develop resilient, affordable housing, as well as innovative local government policies and plans advancing disaster debris deconstruction, reuse, and recycling opportunities.

[2] Download all Region 9 meeting recordings (.mp4) and presentations (PDF) for all 3 sessions here: https://drive.google.com/drive/folders/1Yxm0o__LeJ5blUqjxBWqzCUdaPZDLWx3?usp=sharing

Virtual Reality visualization of sea level rise and storm impacts on Santa Cruz, California's low-income Beach Flats neighborhood. (Photo: Virtual Reality Technologies LLC.)

- Envisioning innovative and resilient disaster debris management: Breakout groups discussed building blocks needed at the federal, state, and local level to push innovation in disaster debris management, as well as how the federal family can help disseminate best practices and lessons learned from disaster debris resiliency life cycle experts.

Panelized deconstruction was used to deconstruction a home in a floodplain buyout in Alachua County, Florida, and the lumber was used to build new Section 8 affordable housing inland. (Photos: Brad Guy)

- **Opportunities and hurdles to advancing innovative and resilient disaster debris management**: Workshop speakers and participants focused on the highest and best use of materials – through deconstruction and reuse, as well as advancing recycling, composting, and mulching. Breakout groups discussed how to best advance more sustainable disaster debris management, including specific best practices that should be amplified, policy opportunities available to enable innovation, priority research needs that should be tackled, and key hurdles.

Clean green waste was mulched and given to residents and corrugated metal roofing was separated for recycling after Typhoon Soudelor in Saipan.

- **Practical next steps to advance innovative and equitable disaster debris management and resilience:** Breakout groups discussed ways to advance priority opportunities for innovative and equitable disaster debris management and resilience in five key areas: funding and incentives; policy and guidance; technology, research, and development; planning resources and knowledge sharing; and partnerships and coordination.
- **Executive session:** An executive session with opening remarks by Deputy Assistant Administrator Carlton Waterhouse and EPA Region 9 Division Director Jeff Scott. shared video highlights and key takeaways from the Region 9 workshops.

Key Takeaways

Key takeaways from the Region 9 workshop included:

- **Federal leadership is needed to mitigate the disaster debris impacts driven by climate change.** Example actions include:
    - Targeting funding and resources to those with greatest need (e.g., environmental justice, Tribes, islands)
    - Identifying buildings that have not been damaged and have high reuse potential so that they may be repaired/fortified or deconstructed for reusable materials Visualizing future impacts and sharing those through virtual reality can motivate local community and government action now
    - Updating sea level rise retreat guidance around removal conditions for development in potentially hazardous areas which currently requires demolition and landfill disposal to include requirements for deconstruction and reuse
- **Develop engagement and siting guidance to** prevent "dumping on" disadvantaged communities.
- **Deconstruction policies are growing across the nation and post-disaster potential for safe deconstruction and reuse is proven** (e.g., Hurricanes Katrina and Irene). There is opportunity to build and adapt on these examples in R9.

Nonprofit organizations built disaster recovery sheds after Hurricane Katrina to store recovery workers' belongings. The sheds were built entirely from reclaimed materials with the exception of the metal roofing. (Photos: Brad Guy)

> *"I loved that national attention is finally being brought to the reuse and deconstruction arena. Construction and demolition waste should be minimized, and design should consider deconstruction in planning phases."*
>
> *– Region 9 Workshop Participant*

A home flooded during Hurricane Irene in New Jersey was deconstructed by Rutgers University Students and recycled concrete base and wood were used on-site to build a resilient floodplain pocket park. (Photos: Tobiah Horton)

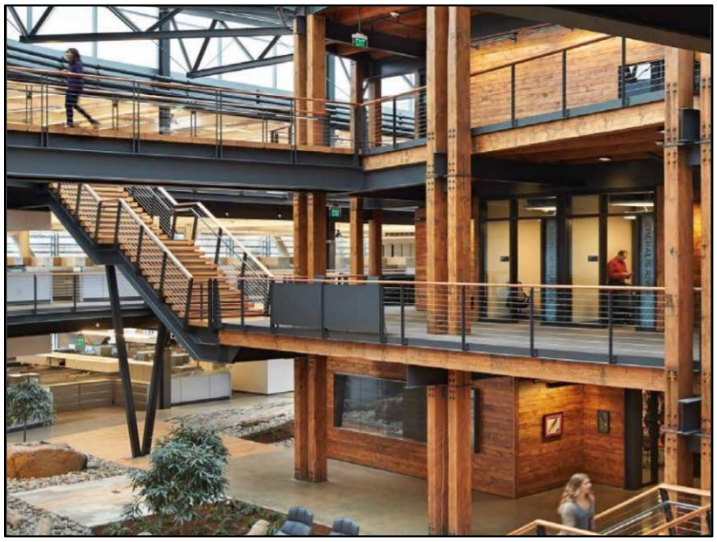
- **Federal guidance and investment** to reimburse and provide incentives for equitable deconstruction and reuse is needed. Example needs include:
  - Policy updates to reduce waste and conserve embodied carbon (e.g., circular economy)
  - Infrastructure investments in reuse facilities (warehouses, storage yards)
  - Local and state deconstruction ordinances/infrastructure so the region is prepared to salvage materials post disaster (e.g., *One home ~ 5 tons lumber & 7.6 MTC02 equivalent – Portland.)*

Examples of reuse infrastructure: reclaimed building materials storage yards, processing centers, and warehouses. (Photos: Brad Guy)

- **Quick win for updating grant guidance:** Explicitly list deconstruction and reuse as eligible activities for grants -- infrastructure, mitigation, job training, etc.
- **State and local advance planning builds resilience in communities.** Examples include:
    - Having federal guidance, advance planning and exercises, model plans and scopes of work, (e.g., Forest Service Zero Waste Fire Camps) can increase capacity for communities to develop plans
    - Supporting federal reimbursement for landfill diversion (reuse, recycling, composting, mulching) and developing disaster debris management plans that builds on LA County Northridge Earthquake precedent requiring FEMA reimbursement of higher cost debris recovery
- **Support deconstruction job training/certification**. Deconstruction creates 6 times more jobs than mechanical demolition
- **Expand markets:** Federal purchasing requirements (e.g., EPA Comprehensive Procurement Guidelines) can drive reuse and low embodied carbon materials

Portland, Oregon developed a Deconstruction Job Training Program.

The Forest Service's Zero Waste Incident Recycling Blanket Purchase Agreement provides recycling services, signage, and measurement at Fire Camps. https://www.fs.usda.gov/managing-land/fire/sustainable-ops/incident-recycling

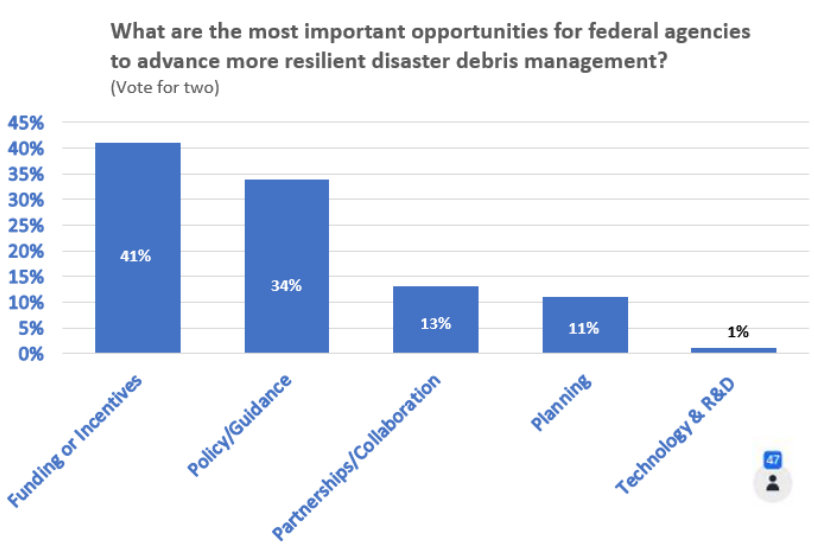


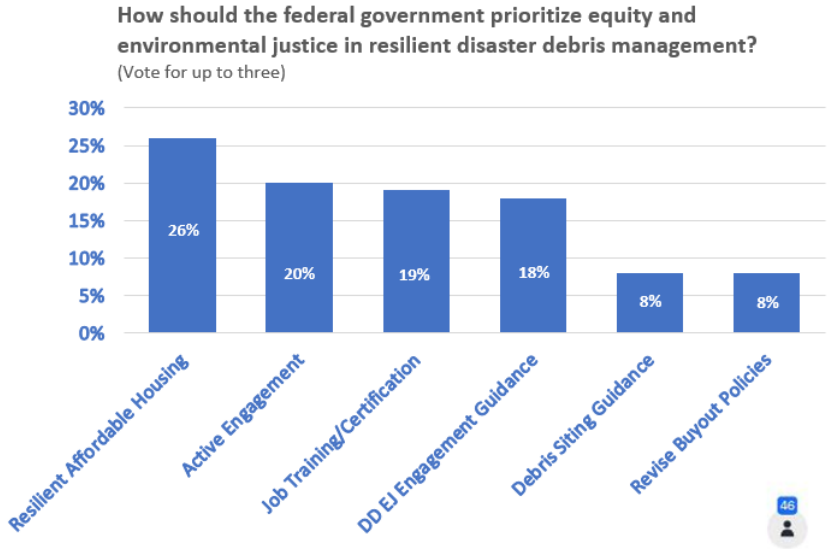
(Left): The Federal Center South U.S. Army Corps Seattle District Headquarters Building is a LEED Gold building completed by the U.S. General Services Administration in 2012 using 300,000 board feet of structural and nonstructural lumber from an adjacent warehouse that was deconstructed. https://www.gsa.gov/cdnstatic/GSA_FCS_Press_Book_email.pdf

Figure 1 below presents the results of real time polling that captured workshop participants' views of key opportunities for the federal family to advance equitable and resilient disaster debris management.[3]

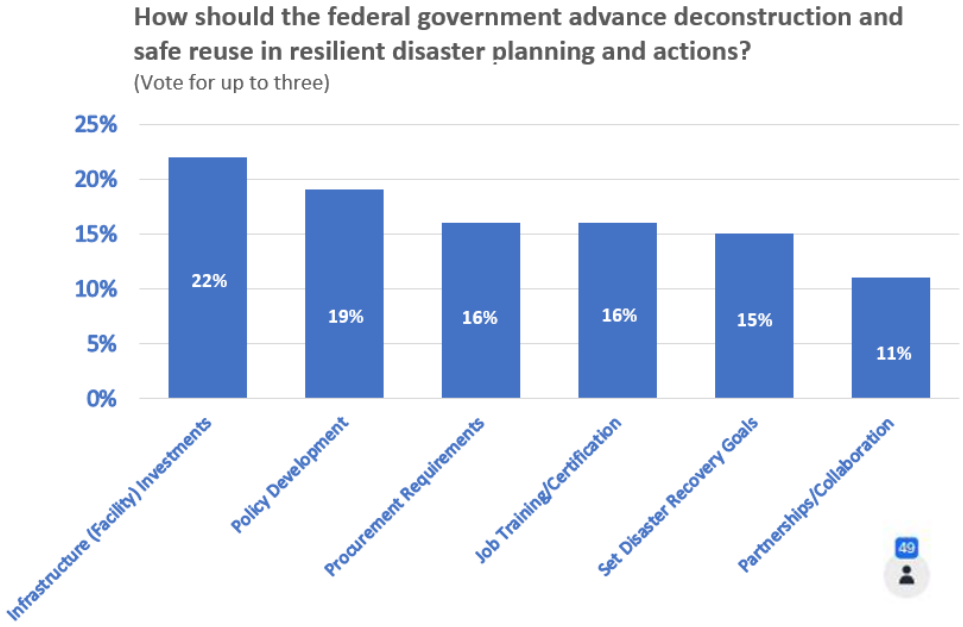
[3] Note, there is no gaps and solutions table for R9 (as there is in R5 section above) due to the altered structure and for the R9 sessions. Framing of the R9 sessions focused more on innovation and actionable opportunity areas.

Figure 1. Gauging priority opportunity areas (poll results)





DD = Disaster Debris



For specific details and examples on opportunity areas for the federal family to advance equity, innovation, and resilience in disaster debris management, see the full downloadable meeting summary notes.

Proposed Actions and Next Steps to Reach Identified Goals

As part of a workshop evaluation, participants ranked the following "quick win" priorities identified during the workshop. These were ideas that emerged regarding ways in which the federal family could make progress toward the vision and goals of the workshop in the near-term. Each item includes a possible timeline for implementation.

- **Organize the ideas generated from the workshops into broader categories,** then ask workshop participants which categories they would like to work on as a group or pursue on their own (see Box 1 for potential topical areas for working groups).
    - 2022: Establish 1-3 priority working groups, identify leads, develop goals and objectives for working groups, invite representatives to join working groups, initiate quarterly meetings
    - 2023 – ongoing: Quarterly meetings for working groups; share deliverables
- **Develop and deliver webinars and trainings** on key entry points to incorporate deconstruction and reuse into local policy mandates, environmental justice and disaster resilience, and other priority topics.
    - 2022: Identify lead agency and contact, develop, and conduct trainings
    - 2023-2024 – ongoing: Conduct trainings
- **Showcase examples, case studies, pilot projects** of successful disaster debris management and resiliency strategies and efforts. *(This is like next steps from R5 workshop.)*
    - 2022-2023: Identify lead agency and contact, identify website and approved template, develop, and compile relevant examples, case studies, and pilot projects
    - 2024 – ongoing: Update resources annual (or more frequent) basis, share resources to wide audience
- **Change federal (especially FEMA & HUD) grant eligible activities lists to include disaster debris planning and infrastructure**.
    - 2022: Meet with smaller groups (i.e., working groups mentioned above) to move guidance forward on specific topics (environmental justice engagement/siting, and FEMA policy supporting reimbursement for deconstruction, reuse, recycling and composting, sea level rise policy focus on environmental justice and materials)
    - 2023-2004 – ongoing: Advise and consult with federal agency decision-makers to update their grant eligibility guidelines

Box 1. Potential Working Group Topics

- Equity/environmental justice
- Infrastructure development
- Deconstruction and safe reuse
- Job training and certification
- Funding opportunities
- Policy development
- Recycling and/or composting
- Embodied carbon and government purchasing
- Resilient affordable housing
- Disaster debris planning & communications
- Sea level rise
- Stakeholder engagement/ communications

Common Themes and Participant Mix

Common Themes

Common themes that arose in both regional workshops include:

- Leverage existing funding resources: There are a variety of federal funding programs that are not directly related to disaster mitigation, response, or recovery that communities can tap into to secure funds for activities relevant to debris management; the federal family needs to better understand how these programs intersect with disaster debris management and make this information visible to community leaders.
- Build a community of practice: Participants emphasized the importance and value of engaging in small group discussions with other practitioners and experts focused on improving disaster debris management and resilience to learn about best practices, existing resources, and build their professional networks.
- Establish ongoing forums for knowledge exchange: A key next step is to establish ongoing forums (e.g., working groups) for further information sharing and collaboration.
- Develop resource center with technical assistance: Developing, promoting, and maintaining a resource hub and offering technical assistance to support communities in planning for disaster debris management and resiliency is critical.
- Develop case studies and pilot projects: Document and disseminate key case studies and invest in pilot projects that help build the business case and demonstrate the resilience benefits of improved disaster debris planning and mitigation.

Participant Mix

The participant mix may have affected overall engagement, participation, problem identification, solutions, and outcomes., including:

- Majority federal representatives (mostly EPA, including EPA observers): Given the intention of these workshops to help align the federal family, having most federal representatives at the workshops was expected. However, most federal agency participants were EPA representatives and observers. Nevertheless, participants from other agencies expressed enthusiasm for the topic and generally an openness to engaging in further dialogue and collaboration. Both Region 5 and 9 Workshops included representatives from 8 federal agencies; however, there was limited continuation of their participation across all three sessions. Additional federal participants from USACE, FEMA, USDA, and BIA would be valued in future workshops.
- Need for additional local, state, tribal, and islands level agency representatives: Participants from both regional workshops identified the need to enlist more representation from local and state agencies to better understand specific needs and problems facing communities, and how the federal family can help address them.
- Need for additional environmental justice/underserved community representatives: Additional representation from underserved community groups would be helpful for understanding priorities for equitable disaster debris planning and management.
- Need for additional academic and NGO representatives: The workshops benefitted from academic and NGO participation and including more non-governmental participants could broaden perspectives and capacity-building.
- Explore opportunities to engage private sector representatives: While the focus of these workshops was on government participants, EPA planners heard that engagement with businesses working on resilient design, insurance, and waste management may be beneficial in future workshops.

Appendix. Region 9 Summary

U.S. Environmental Protection Agency Region 9
Resiliency and Natural Disaster Debris Workshop Series

July 20, 22 and August 19, 2021

This appendix summarizes input provided by U.S. EPA Region 9 Workshop presenters and participants. Links have been added and the input was sorted, but the comments provide direct input received at the workshop.

1. Funding & Incentives

Support Underserved and Disaster-Impacted Communities

- Funding/resources prioritized for low-income communities
  (Note: The federal government is focusing on this through the Justice40 Initiative)
- More funding should be allocated to communities that are frequently and historically impacted by natural disasters
- Integrate with pre- and post-disaster support services and training for community members
- Ensure low-income and historically excluded communities receive adequate resources
- Work on equity of federal buyout programs
- Materials management infrastructure investments should prioritize marginalized communities
- Jobs and job training equity/justice issue – paying "outsiders" to do the work but relying on local volunteers (e.g., Hurricane Irma, FL)

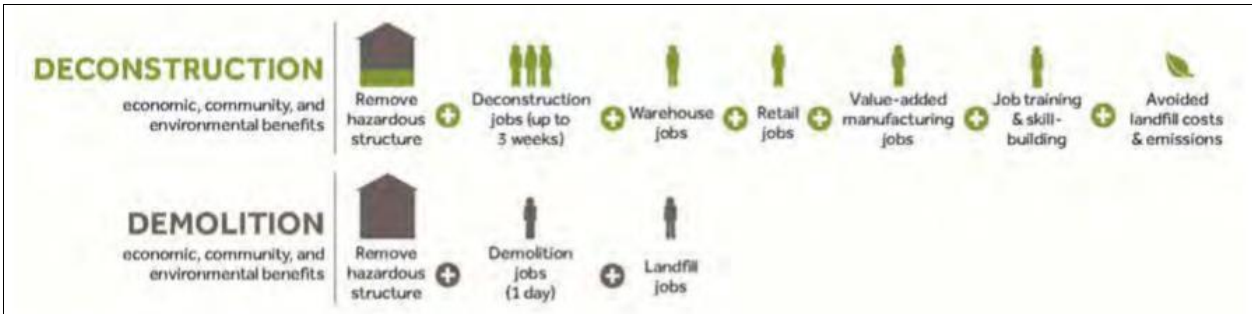
High Level Funding Ideas

- Incentives – THINK BIG – Tax Credits, Opportunity Zones, etc.
- LOCAL funding for capacity building/education

- Currently communities have limited resources, funding, and capacity to plan for and response to disasters
- More funding should be provided for local communities to hire consultants to develop their pre and post disaster plans
- Think through how to contract – key element was allowing contractors to find market solutions for the trees – incentives to get people to do this
- Federal mitigation planning and grant funding
- Federal funding programs such as FEMA are not long enough (only 18 months) and should be extended
- Seed funding for infrastructure
- Federal mitigation planning and grant funding
- Research & development tax credits, research funding
- Need to get standards for deconstruction and salvage into business-as-usual tools, especially cost estimators
- Mimic state and federal financial tax credit and tax deferment incentives such as stream mitigation, nutrient credits, conservation easement credits, R&D credits, opportunity zone, IRS 1031 property exchanges
- Incentives for equity, innovation, and resilience to be used as public cost matches of federal grants
- Investments in affordable housing using non-toxic materials is critical, especially with climate change and increasing disasters
- Idea for disaster debris prevention - Fund research to determine the amounts and characteristics of superfluous building materials on existing buildings and determine feasibility of removing these materials and sending to reuse/recycling markets

Funding for Materials Recovery: Deconstruction, Reuse, Recycling, Composting and Infrastructure

- Explicitly establish and incentivize safe reuse, recycling, and composting over disposal in federal guidance
- Significant reuse benefits to recovery/local economy include local jobs to support transition into construction and retail, low-cost building materials, maker/ fabrication/artist industries, property, sales, and payroll taxes



City of San Antonio, Treasure in the Walls Reclaiming Value Through Material Reuse in San Antonio, February 2021

- Establishing grants that prioritize deconstruction and reuse programs, policies, infrastructure, and workforce development programs
- Leverage deconstruction tax donation deductions to incentivize deconstruction and reuse in buyouts
- Funding for pre-disaster deconstruction to relocate buildings away from hazards
- Fund deconstruction and redistribution efforts
- Add deconstruction and reuse infrastructure into eligible activity lists for appropriate grants
- Warehouse/retail space is a hurdle. Need help from the state and local government for warehousing. We can handle the redistribution of the material but can't afford the cost of commercial space
- Revise or establish federal tax credits that incentivize/reward the use of reclaimed materials in retrofit projects (specifically the Historic Tax Credit Program administered by the National Park Service)
- Conservation tax credits and conservation easements incentives could encourage people to deconstruct their buildings, barns, etc., and salvage wood and other materials before the land is converted back into a wetland
- Providing funding for research projects that focus on materials innovation, specifically reusing salvaged materials to produce new building materials (Circular Economy approach)
- Incentivizing or supporting large-scale, public reuse or salvage centers in local communities - shifting from a recycling model to a reuse model
- Public investment/public benefits space for reuse infrastructure including storage and processing
- Strategically local reuse facilities including warehouses, de-nailing yards in regions to prepare for disasters
- Creating an incentive for congested communities with older buildings to think now about deconstruction
- FEMA incentive to reuse and deconstruction similar to FEMA recycling pilot

Funding for Jobs and Job Training

- Add deconstruction and reuse job training activities into eligible activity lists for appropriate grants
- Financial assistance for workforce development
- Provide funding support for job training in the traditional construction trades (restoration/repair of older & existing housing stock + deconstruction) to increase contractors locally, which makes these services more affordable and accessible to all
- Job training and creation opportunities matter (example: Hurricane Katrina deconstruction and rebuilding)
- EPA deconstruction job training certification like Lead Based Paint Certification (3rd party trainers)

Procurement Requirements for Salvaged Materials

- Federal procurements that specify salvaged material (e.g., Comprehensive Procurement Guidelines, low embodied carbon purchasing requirements)
- Procurement requirements – federal or post-disaster for reused/low embodied carbon materials
- Focus on green procurement

Other Ideas

- Give priority funding and engagement to debris management groups that are employee owned and employee managed (Examples of employee owned/employee managed groups are the Mondragon community in Spain and Cooperative Home Care Associates in NY)
- Allowing more room for mitigation projects to upscale culverts and drainage structures that run through communities

Federal Funding Resources

- Search all federal grants at Grants.gov
- Federal Disaster Resilience Funding - nearly $5 billion this year
  FEMA Building Resilient Infrastructure in Communities (BRIC) Program and Flood Mitigation Assistance (both close Jan. 28, 2022, 3 p.m. Eastern Time): Fiscal Year 2021 Notices of Funding Opportunities for Hazard Mitigation Assistance Grants | FEMA.gov
- National Park Service Tax Incentive Program
- Department of Labor National Dislocated Worker Grants support disaster debris management & could be used for reuse and disaster debris recovery
- EPA Sustainable Materials Management Grants (search all federal grants at Grants.gov) for solicitations

2. Policy/Guidance

Equity/Environmental Justice/Affordable Housing

- Address equity/justice concerns with disparity in disaster debris siting decisions and the use of waivers
- Invest in high-quality affordable housing in areas not at increased climate/disaster risk
- Equity/justice of site oversight and management, in light of additional post-disaster storms
- Establishing guidelines for a pipeline for reclaimed materials to build affordable housing, like a Salvage-to-Accessory Dwelling Unit (ADU) program with pattern books
- Avoid presumptions about access to reduce inequities (e.g., digital divide, poor transportation infrastructure)
- Immediate needs are not always environmental (emergency shelter, food, transportation, etc.)
- Shelter-in-place orders are not the answer for some homes not built to breathe/limited ventilation
- Ownership of materials and equity – communities that were pushed out and then someone else is benefiting for those materials
    - When dealing with private homeowners, materials are owned by owner. Deconstruction companies either buy them (credit) or tax credit for their donation to a non-profit
    - In case of imminent domain, the government agency is justified to take property to pay fair market value
    - This is gets even more complicated when the structure is above/on newly public trust land (below mean high tide)
- Equitable decision-making has multiple benefits (example - community blocked with no exit route/blocked by railroad had major community and economic benefits when additional access route was added)
- Develop guidance on designing/upgrading buildings for passive survivability situations when electricity and water are cut off by disasters

General Policy Comments

- Create political will at the top to move forward to investigate and implement priorities
- Need political will, policy, procedure, awareness, and access
- Need interagency workgroup to align work – US Army Corps of Engineers Silver Jackets Program, EPA, FEMA, HUD
- Provide more disaster guidance to different kinds of disasters (e.g., wildfire)

Deconstruction, Reuse, Recycling and Composting

Broad Comments

- Legislation to put more emphasis on material reuse and recycling. Also, help with the need for warehousing and yard space
- Develop certifications - Recycling and waste facilities are certified, but reuse facilities are not certified
- Connect Zero Waste actions (green purchasing, reuse, recycling, composting programs) to disaster debris planning, response, and recovery
- Set goal for percentage of buildings or waste to be deconstructed/reused in disasters and establish infrastructure
- Create deconstruction policies to help before and after a disaster
- Delineate between deconstruction before vs after a disaster
- Deconstruction buyouts can convert to resilient floodplain parks to protect neighborhoods against future storms/floods
- Develop standards for reuse of material
- Reused materials can be used to build temporary shelters (materials or roof/wall assemblies) after disasters
- Supply and demand of deconstruction:
  1) Who makes the decisions about materials in rebuilding? Seems to be the developers. What are the leverage points there?
  2) Don't forget about fixtures and furniture
- No demolition - every building has something that can be recovered

Multiple Levels of Government

- Sea level rise - current state guidance states all debris to be taken to a landfill - state & FEMA guidance on demo/acquisition projects could be updated with deconstruction guidance and streamlining from cost-benefit aspect
- Support development of state and local deconstruction ordinances/infrastructure so the region is prepared to salvage materials post disaster
- Deconstruction buyouts can convert to resilient flood plain parks to protect neighborhoods against future storms/floods
- Develop standards for reuse of material
- Reused materials can be used to build temporary shelters (materials or roof/wall assemblies) after disasters
- Set federal post-disaster deconstruction/reuse goals after disasters (percentage debris or number of buildings)
- State and local planning templates (FEMA, HUD), model policies/ordinances to support disaster debris recovery & FEMA reimbursement & scopes of work
- Federal/State policy guidance prioritizing safe deconstruction/reuse, recycling & composting (policy, FEMA Benefit-Cost Tool, etc.) & providing guidance/tools

- Establish government reuse storage for disaster recovery away from areas at greatest risk of disaster (coast, fault lines, etc.) so materials can be brought in to support recovery
- Panelized deconstruction to remove the roof, walls, can save time and increase safety/can reuse whole walls
- Develop model plans for reclaimed material disaster recovery sheds, post-disaster repair, and infrastructure (reuse warehouse)

Federal Government

- Federal policy supporting deconstruction/reuse, recycling policy would be more efficient and effective than having every local jurisdiction have to justify
- Federal guidance on material reuse
- Update FEMA Benefit Cost Analysis to support reuse, recycling, composting (currently only covers demolition and landfill disposal)
- Set federal post-disaster deconstruction/reuse goals after disasters (percentage debris or number of buildings)
- Encourage in FEMA disaster debris management recovery program, the deconstruction of buildings and encourage the hiring of local contractors and/or training of local labor to conduct such appropriate buildings
- EPA Sustainable Materials Grants can emphasize deconstruction and encourage local government to instill these policies in their requirements

State Government

- California climate legislation SB 1383 to keep organic materials (including wood) out of landfills to reduce greenhouse gas emissions from landfill methane, a powerful climate pollutant

Local Government

- Mandatory local government deconstruction ordinances
  can help communities prepare by building infrastructure and expertise to manage disaster debris
- Local governments operate a large Houston-area building materials reuse warehouse, and many materials were taken there and cleaned off after Hurricane Harvey
- Mandatory local deconstruction – in Portland average home deconstruction reuses 5 tons of wood and conserves 7.6 metric tons net CO_2 equivalent
- Support adoption of local government deconstruction policies which are rapidly growing rapidly in U.S. communities through executive orders, ordinances, incentives, plans, or Deconstruction Advisory Groups

Building Codes

- Under current International Construction Code (ICC) building code alternative materials and methods with code official support, homes (including structural) can be built with reclaimed lumber under (FL Section 8 Housing from floodplain buyout deconstruction)
- Building codes (resilient design guidance and use of reclaimed materials, see Oregon and Washington codes allowing reuse of undamaged lumber without regrading)

Procurement Policy

- Add reclaimed lumber to EPA & USDA federal procurement guidelines
- Buy local and reclaimed by Federal government
- New federal focus on embodied carbon in materials, can reduce through local reuse because there's no mining, manufacturing, transportation
- Supply and demand of deconstruction: feds incentivize use of recycled materials

3. Technology, Research & Development

Equity/Underserved Communities

- Connect virtual reality to other data sources on underserved communities (EPA EJSCREEN example)
- Establish a holistic, equity-based survey methodology for assessing existing buildings and assigning value to buildings that may be impacted by natural disaster

Broad Comments

- Design for deconstruction
- Consider opportunities to connect virtual reality sea level rise visualization to communicate (Sea Level Rise Explorer / Research Paper)
- Build out virtual reality to connect Building Information Modeling (BIM), waste facility data
- Consider how infrastructure and system interdependencies post disaster will affect debris management (e.g., lack of reliable access to utilities for possibly weeks or months, fuel shortages, workforce disruptions, etc.)
- Need to innovate emergency/short term composting strategies for human waste
- More research needs to be conducted on how to best relocate people after a disaster occurs
- Need some sort of final accounting on what went wrong and what went right after a disaster to allow communities to better understand how they can improve their response and recover efforts
- More research on value of wholistic benefits/external factors of reuse on environment, public health, climate, etc.
  Research on existing buildings and find ways/strategies to expand their lifecycle

(expand the lives of homes), this could be potentially a great opportunity for job training/job source
- Surveying locations for resource deployments
- Research and develop benefits for communication to State and local government
- Online marketplaces

Embodied Carbon/Energy
- Embodied carbon – add reuse factors to EPA Waste Reduction Model (WARM) and Recycled Content (ReCon) Tools
- Analyze the carbon and energy benefits (net) between business as usual (landfill) and alternative (deconstruction/reuse). Have a base case disaster with X number of square feet and compare each scenario
- Carbon neutral building

Materials Recovery Research
- Research and track effective goals/targets for reuse
- Deconstruction is not just for old growth lumber, examples of 1970s home and reuse of plywood and Oriented Strand Board (OSB)
- Deconstruction times – the general estimate is 1 week/10,000 square feet, could so more research
- Deconstruction economic impacts/job creation often estimated at 6x more than landfilling and incineration, more disaster job creation research would be helpful / also jobs in retail, rebuilding, etc.
- Research types of existing local ordinances that may support or hinder disaster debris management activities
- Research guidance highlighting easy ways to determine what buildings can be safely deconstructed and how (perhaps a typology)
- Research how to determine termite damage quickly
- Research guidance on what can and can't be reused for different purposes
- Need tool to assess time labor, cost, value of home, to help encourage buy-in. Include an initial assessment with tiered approach
- Research on existing buildings and find ways/strategies to expand their lifecycle (expand the lives of homes), this could be potentially a great opportunity for job training/job source
- Need more research to see what unneeded materials are on homes and find ways to incentivize the removal of these unneeded materials
- Support automation innovation for de-nailing lumber
- Online marketplaces

- Post-disaster/Buyout - Simple building recovery potential assessment of:
  - move, raise
  - deconstruction (major)
  - deconstruct (minor "cherry pick")
  - demolish (due to damage level/lack of safe to recover materials)
- Support automation innovation for de-nailing lumber

Support Entrepreneurs

- Facilitate innovation and entrepreneurship (lots of opportunities for new small business too)
- Incubator programs to help get entrepreneurs in deconstruction started

4. Planning Resources & Knowledge Sharing

Equity, Environmental Justice, and Underserved Communities

- Ensure that all communities have access to federal and states services to address environmental justice concerns and help communities
- Develop guidelines for environmental justice engagement specific to disaster debris
- Environmental Justice principles relevant to emergency response (key principles summarized)
  2 - Public policy based on mutual respect and just for all peoples
  6 - Education of present and future generations which emphasizes social and environmental issues based on experience and appreciation of diverse cultural perspectives
  7 - Right to participate as equal partners at every level of decision making
  8 - Safe and healthy work environment
  12 - Urban and rural ecological policies to clean up and rebuild or cities and rural areas to provide fair access to resources
- Common EJ community concern – Community is 'dumped on" all of the time, especially during disasters (debris fields without regard to transportation congestion, mixed waste, debris not "contained," illegal dumping common after disasters, multiple pre-disaster sources of pollution, etc.)
- Develop equitable debris removal site best practices
- Environmental justice initiatives, including better practices around communities where English is a second language and resources, and information is not disseminated enough – more funding is needed
- Locating mixed debris (hazardous) near places where people are living should not be allowed except in short-term urgent circumstances (Katrina)
- Develop guidelines for environmental justice engagement specific to disaster debris
- Provide awareness for tribal communities making sure they aren't the dumping grounds for materials but allowing them to benefit from the reuse of the materials

- Develop and share island-specific disaster resilience resources and best practices (e.g., concrete power poles)
- Sense of invisibility, being ignored, and/or forgotten in decisions about cleanup, evacuation make without community input or concern about limited resources
- Building codes reduce disaster impacts, but codes do not apply to tribes and islands unless they adopt them – significant gap that needs to be addressed
- Inclusion of marginalized communities
- Online reuse marketplaces can prioritize access to disadvantaged communities

High Level Opportunities

- Develop guide to debris removal sites and debris management plans to create equitable outcomes from debris removal sites
- Need directory, guidance in the planning stage with resource or directory to provide easy access to resources and expertise in debris management
- National Disaster Recovery planning and guidance is under development in Arizona and Nevada and should include disaster debris guidance
- Education literacy (e.g., FEMA public assistance program - each community is assigned a key program manager to bring them along process)
- Other FEMA Resources:
    - Ecosystems Service Benefits Policy 2020
    - Hazard Mitigation Assistance Guidance
    - Public Assistance Program and Policy Guidance (PAPPG)
    - FEMA Benefit-Cost Analysis (BCA) Toolkit
- Need to consider how best practices and strategies may need to differ depending on the scale of the natural disaster
- Plan beyond building materials – sewage, industrial waste, agricultural waste, green waste, food waste, etc.
- COVID Disaster Impacts – Plans for office furniture reuse and use of vacant commercial space
- Government-coordinated volunteer Climate Corps for disaster response/recovery with disaster debris recovery training (German example - Technisches Hilfswerk with 80,000 volunteers)
- Help local and state governments identify strategies
- Certification and training for workforce development
- Standardizing processes for scale/clarity/consistency
- Still need to be flexible, what works for one city might not work for another
- Pre-disaster planning at the building and community scale
- Need to realize the importance and implications of distinction between slow vs. fast paced disasters

- Cross-federal agency training to stakeholders on how to build preparedness and mutual agreements to triage how to reuse debris
- Share success of multiple non-profits doing deconstruction/reuse projects post-Katrina (research on cost-benefits, amounts of materials salvaged, new reuse businesses, and value of local job creation/psychological impacts)
- Use multi-agency disaster debris planning exercises to prepare for disaster debris management (San Francisco example)
- Climate change mitigation examples
- Knowledge sharing and best practice dissemination
- Following up with community progress and outreach
- Establish R9 newsletter focused on disaster debris management (model FEMA R2 community recovery newsletter)

Specific Suggestions and Tools

- **Planning**
  - Share best local debris management plans and activities through webinars/ training/online
  - Templates for local and state planning would be very useful to help FEMA and others interact and help in a disaster context
  - Develop a streamlined and proactive debris management process to help communities be prepared before a disaster occurs -- checklists, outreach, and visual models could be helpful tools
  - Linking disaster debris management plans to long term recovery plans
  - Communities share lessons learned to help with future planning

- **Resilient Design**
  - Share FEMA, insurance industry, code best practices for designing buildings to withstand disasters
  - Design for deconstruction
  - Carbon neutral building
  - Passive survivability – designing buildings and services to maintain life-support conditions during/after disasters when utilities may be shut off. Resilient design best practice for rebuilding.

- **Deconstruction and Reuse, Recycling and Composting**
  - Get the word out to potential HUD grantees to know that they can use HUD funding to plan for deconstruction
  - Precedent (Northridge Earthquake, Los Angeles) that FEMA reimbursement for diversion from landfills has been supported even when more expensive than

landfill disposal if supported by community policies/approved in state and federal disaster debris plans
  - Local Disaster Debris Plans with strong local government Zero Waste goals/policies, can be incorporated/approved by states and FEMA
  - Share embodied carbon calculators and conversion factors to support climate outreach of reuse, recycling and composting (EPA WARM Model, California Air Resources Board Wood Reuse Calculator – Search Reuse)
  - Make deconstruction building materials available to local disaster victims post disaster through a FEMA program
  - Make more explicit linkages between disaster recovery and reuse/revitalization
  - Emphasize cultural aspect of reuse
  - Focus on historic preservation and don't forget to engage these groups because they have boots on the ground and cultural heritage connections to reuse
  - Develop an EPA or federal deconstruction certification
  - Make it easier to integrate supply chain issues, add in more warehouses and storage, and have materials be available in stores, maybe an online exchange
  - Increased championing of the triple-bottom-line aspects to deconstruction and reuse: people, planet, profit

Sea Level Rise

- Sea level rise – need planning to move/deconstruct & reuse large quantities of undamaged building materials
- Sea level rise guidance is under development in California and could incorporate disaster debris recovery
- Virtual reality can be more effective than maps to support sea level rise actions (evacuation, buying flood insurance, etc.)
- Connect this work to managed retreat
- Climate change retreat/sea level rise planning to move/deconstruct buildings

5. Partnerships & Coordination

Diversity, Environmental Justice

- Coordinate, plan and communicate early (before disasters) with non-traditional stakeholders and focus on underserved and tribal communities
- Develop guidelines for EJ engagement on disaster debris issues
- Critical to prioritize environmental justice
- Identifying and coordinating with non-traditional disaster recovery stakeholders
- Mapping is not enough to advance equity, ground-truthing is critical Environmental justice
- Community concerns – lack of trust in all levels of government based on history, past actions

High Level Ideas

- Focus on how in-place programs can incorporate debris management in their standards to further incentives for new programs to incorporate debris management

Government

- Expand who federal agencies are working with -- need to think more outside the box about productive collaborations across agencies, non-profits, etc. Can potentially address multiple issues (i.e., housing, jobs, etc.)
- Establish partnership with the National Park Service or GSA as a federal property management leader to develop guidelines and best practices for using reclaimed materials from deconstructed buildings to repair other buildings (organ donor approach)
- Bring more local partners to the table early on
- Share government scopes of work for deconstruction (pre- and post-disaster)
    - Example: Share Forest Service Zero Waste Fire Camp Blanket Purchase Agreement contract model for disaster response and recovery work

Other Stakeholders

- Partner with external organizations: e.g., American Institute of Architects, American Planning Association, American Society of Civil Engineers, American Society of Landscape Architects, National Trust for Historic Preservation (Good Samaritan Laws)
- How to best set up partnerships with different entities (art groups, schools, job trainings) to reuse materials?
- Work with International Code Council to align Model Residential and other building codes for the use of salvage materials where appropriate
- Partner with local non-profits that work with post incarcerated populations for workforce development/opportunities
- Zero waste experts and organizations
- Climate mitigation planners
- External partnerships – schools, architects, planners, historic preservation, etc.
- NGOs – everyone. Artic, hotels and resorts.
- Partner with external organizations: e.g., American Institute of Architects, American Planning Association, American Society of Civil Engineers, American Society of Landscape Architects, National Trust for Historic Preservation (Good Samaritan Laws)

Communications/Outreach

- Need to increase communication to determine who can help remove/manage debris and to learn more about what resources are available out there
- Need to increase transparency and access to best practices so stakeholders can utilize this information

- Share state and federal approved Disaster Debris Management Plans featuring waste reduction, reuse, recycling, and composting
- The EPA Region 9 Bay Area Deconstruction Workgroup including government, industry and NGOs interested in deconstruction is a great model for collaboration that could be used in other parts of the country
- External partnerships – schools, architects, planners, historic preservation, etc.