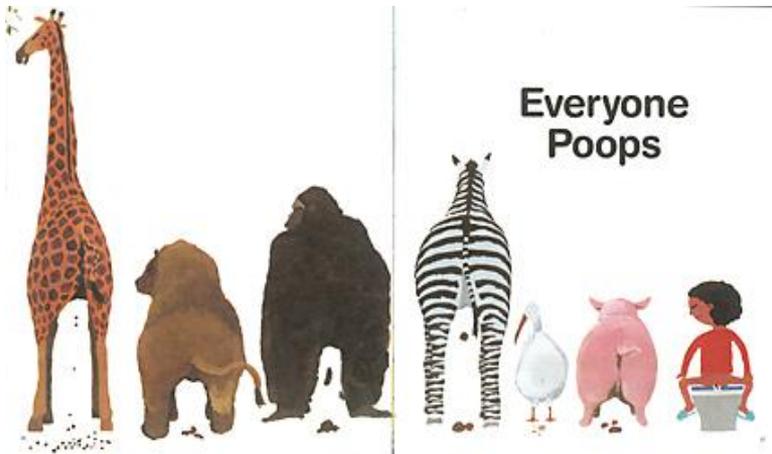


Disaster Sanitation

When There's No Place to Go

Laura Hall, RDPO – rdpo@portlandoregon.gov



RDPO

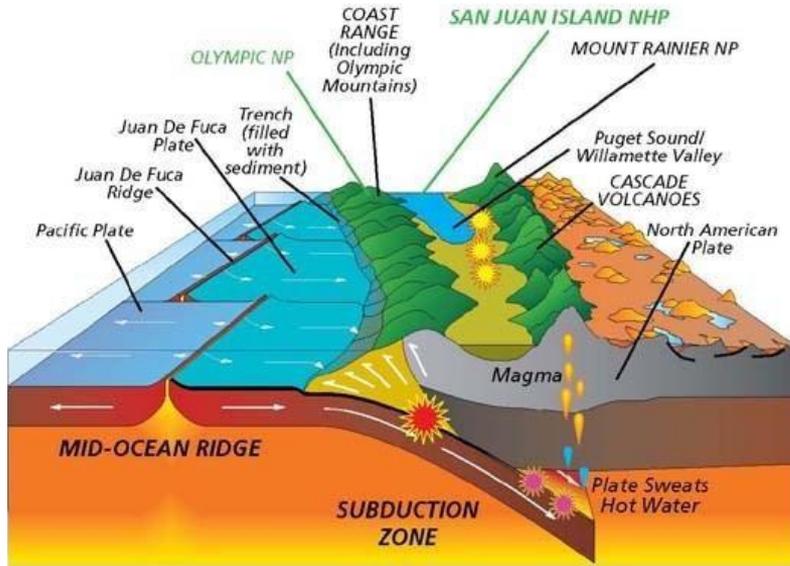
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Where will we go?



Cascadia Subduction Zone Earthquake



- Nearly 700 mile fault off the coast
- Magnitude 8.0–9.0 earthquakes
- Several minutes of shaking
- Damage to water and sewer lines



Hepatitis A
E-coli
Cholera
Cryptosporidiosis
Encephalitis
Gastroenteritis
Giardiasis
Dysentery
Salmonellosis
Yersiniosis

Leptospirosis
Methaemoglobinaemia
Poliomyelitis
Schistomsomiasis
Campylobacteriosis
Shigellosis
Paratyphoid Fever
Typhoid Fever
Norovirus
(Diarrhea)



Christchurch, New Zealand (2011)







Regional Disaster Preparedness Organization



Portland Metropolitan Region
(Clackamas, Clark, Columbia,
Multnomah, Washington counties)

**Collaborating to increase the region's
resilience to disasters**

Disaster Sanitation Task Force

Representatives from:

- Public Health
 - Public Works
 - Solid Waste & Recycling
 - Emergency Management
 - Planning & Environmental Sustainability
 - Oregon Department of Environmental Quality
- ...with input from PHLUSH

**Multi-Jurisdictional
Multi-Disciplinary**

Assumptions

- **Systems partially or fully out of service for many months**
- **Simple, cheap, effective, hyper-local, and limit exposure**
- **No single method**
- **Portable toilets aren't an option**
- **Further messaging within 30 days**

Sue Mohnkern

Retired Public Health Program Supervisor
Washington County

Scott Johnson

Emergency Manager
Clark Regional Emergency Services Agency

Erin O'Connell

Environmental Services Specialist
Columbia County Wastewater

Sue Mohnkern

Developing recommendations

Scott Johnson

Creating public messaging campaign

Erin O'Connell

Developing a cleanup plan

No Best Practices Available



Clackamas County Disaster Management	Nancy Bush	City of Clatskanie	Ray DiPasquale
Clackamas County Public Health	Julie Hamilton	City of Portland, Bureau of Planning & Sustainability	Pete Chism-Winfield
Clackamas and Columbia County Health Officer	Sarah Present	Portland Bureau of Environmental Services	Steve Behrndt
Clark County (drinking water protection, on-site wastewater protection)	Chuck Harman	Tigard Public Works and Emergency Management	Theresa Reynolds
Columbia County (on-site water management)	Erin O'Connell	Tigard Public Works and Emergency Management	Mike Lueck
Columbia County Public Health	Anne Parrott	Metro	Daniel Nibouar
Multnomah County Emergency Management	Stevie Bullock	Metro	Roy Brower
Multnomah County Emergency Management	Alice Busch	Metro	Bruce Philbrick
Multnomah County Public Health	Uei Lei	Washington County Emergency Management	Ken Schlegel
Multnomah County (Septic/COP), City of Portland, Bureau of Developmental Services	Erin Mick	Clark Regional Emergency Services Agency	Scott Johnson
Washington County Emergency Management	Scott Porter	Oregon DEQ	Heather Kuoppamaki
Washington County Emergency Management	Chris Walsh	Oregon Refuse and Recycling Assn.	Dave White
Washington County Public Health	Sue Mohnkern	RDPO	Emma Stocker
Washington County Solid Waste and Recycling	Thomas Egleston	RDPO	Laura Hanson

Solutions Considered

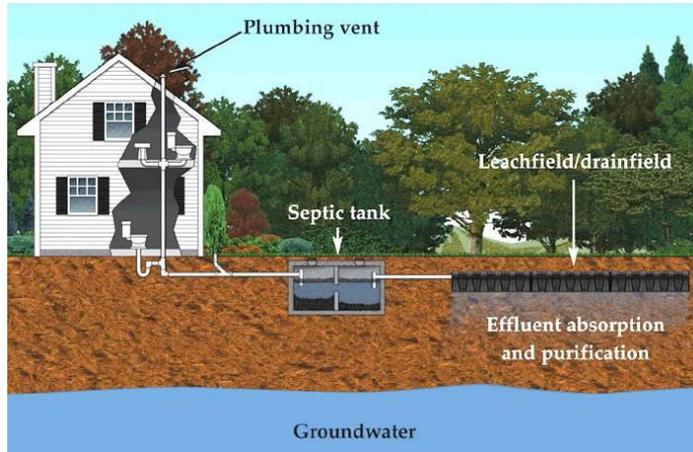
- Portable toilets
- Composting
- Manholes
- Military style “stir & burn”
- Collection tanks
- Etc...



Possible options for individuals / the public							
Methods	Pit Potty/ Trench Latrine	Individual use of bags for fecal collection	Dump into local sewer pipe via man hole	Buckets (cumulative, cistern, tank, dumpster, RV Dump sites etc.)	Existing Septic (probably will be most resilient post CSZ)	Military "Stir and Burn"	Twin Bucket with Local Composting of Solid Waste
Comments	Cheap, simple. Requires ground space.	Reasonably cheap but will require a lot of bags. Plastic is not compatible with burial.	If only solid waste is dropped in sewer pipe, can cause blockages. Will make repairs to sewer very challenging.	Transport to collection sites can be challenging.	Need owner instructions to assure they are intact.	Fuel demand is too high, fuel will be critically needed elsewhere.	Composting is complex, outside of the 2-4-week scope. Twin Buckets are doable. Recommended to combine bags and twin buckets.

If you have a working septic system

Lucky you! Use it.



If you have a wide open space Dig a pit toilet or trench **latrine**



If you have neither Use the **Twin Bucket System**



No-Mix Principle*

*from the PHLUSH.org Twin-Bucket Emergency Toilet Pamphlet

- A normal day's worth of pee has 10x the volume of poo
- Pee is (usually) sterile, while **poo contains pathogens** requiring special handling
- Separation reduces disease risks and odor



No-Mix Principle*

*from the PHLUSH.org Twin-Bucket Emergency Toilet Pamphlet

- Makes it easier to dispose of each
- Pee can be safely dumped into drains or on the ground
- Poo should be collected for safe, hygienic disposal



**PEE & POO
BUCKETS**



**TOILET
SEAT**



**HEAVY DUTY
BAGS**



**LAYERING
MATERIAL**



Layering Material

- Lightweight, dry, and organic
- Carbon-based materials work best



- Sawdust
- Shredded paper
- Bark chips (avoid cedar)
- Dry leaves
- Dry grass clippings
- Peat moss
- Toilet paper
- Hamster bedding

What We Don't Recommend



All Methods Require Good Sanitation Practices



www.EmergencyToilet.org



Next Steps for **Public** Messaging

- FEMA & OEM
- Planners
- Public Health
- PIOs
- Relevant agencies
- Local and non-local relief providers
- Children/schools
- Citizen Corps
- **Everyone!**



What will we do with all that bagged poo?



Collection, Transport, Disposal

Storage & Collection
Garbage Roll Carts
Multiple Buckets with Lids (Longer-Term Storage)
Leak-Proof Drop Boxes
Intermediate Bulk Containers

Transport
Pumper Trucks (not if solids and liquids are separated)
Pickup of IBCs or Buckets (by trucks)
Garbage Trucks

Final Disposition
Existing Wastewater Treatment Facilities
Holding Facilities (Lagoons)
Lined Landfills
Burning of Solid Waste With Woody Debris
Only Recommend Pit Toilets / Trench Latrines (Not Twin Buckets)
Large-Scale Composting
Incineration (of Bagged & Unbagged Feces)

Next Steps for Institutional Messaging

- FEMA Region X
- State and National DEQ
- OR, WA, CA Legislature
- Non-Government Relief Organizations
- Community Emergency Response Teams
- **Everyone!**



Questions?



Thank you!



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