Summary of Timber Harvest Task Force Recommendations for improving the modeling of forest harvesting in Phase 7

October WTWG meeting

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Timber Harvest Task Force background

- Convened in early 2023 at the request of the Forestry Workgroup and the Land Use Workgroup to help improve the mapping and modeling of forest harvest activities in the watershed
- Includes representatives from all watershed states
- Improved reporting of forest harvesting activities to improve mapping in 2024 ed of the LULC data
- Identified multiple opportunities to improve modeling of forest harvest for Phase 7
- Recommendations approved by FWG

Harvested forest land use duration and loading rates

- Phase 6 loading rates for harvested forest land use were estimated based on an average over the three-year period following harvest by Hynicka (MD DNR)
- After a harvest, **land should continue to load as harvested forest for 3 years prior to reverting back to true forest** (it currently only stays in harvest for 1 year).
  - CAST harvested forest land use= land that has been harvested in the last 3 years
- **Loading rates for TN and TSS should be corrected to align with original recommendations from Hynicka**

Land Use	TN Loading Rate Ratio	TN Loading Rate (lbs/acre/yr)	TP Loading Rate Ratio	TP Loading Rate (lbs/acre/yr)	TSS Loading Rate Ratio	TSS Loading Rate (lbs/acre/yr)
True Forest	1	1.68	1	0.08	1	0.07
Harvested Forest (CAST)	7.07	11.88	3.12	0.24	10	0.6
Harvested Forest (Hynicka)	**7.03**		3.12		**3.05**	

Harvested forest default rate

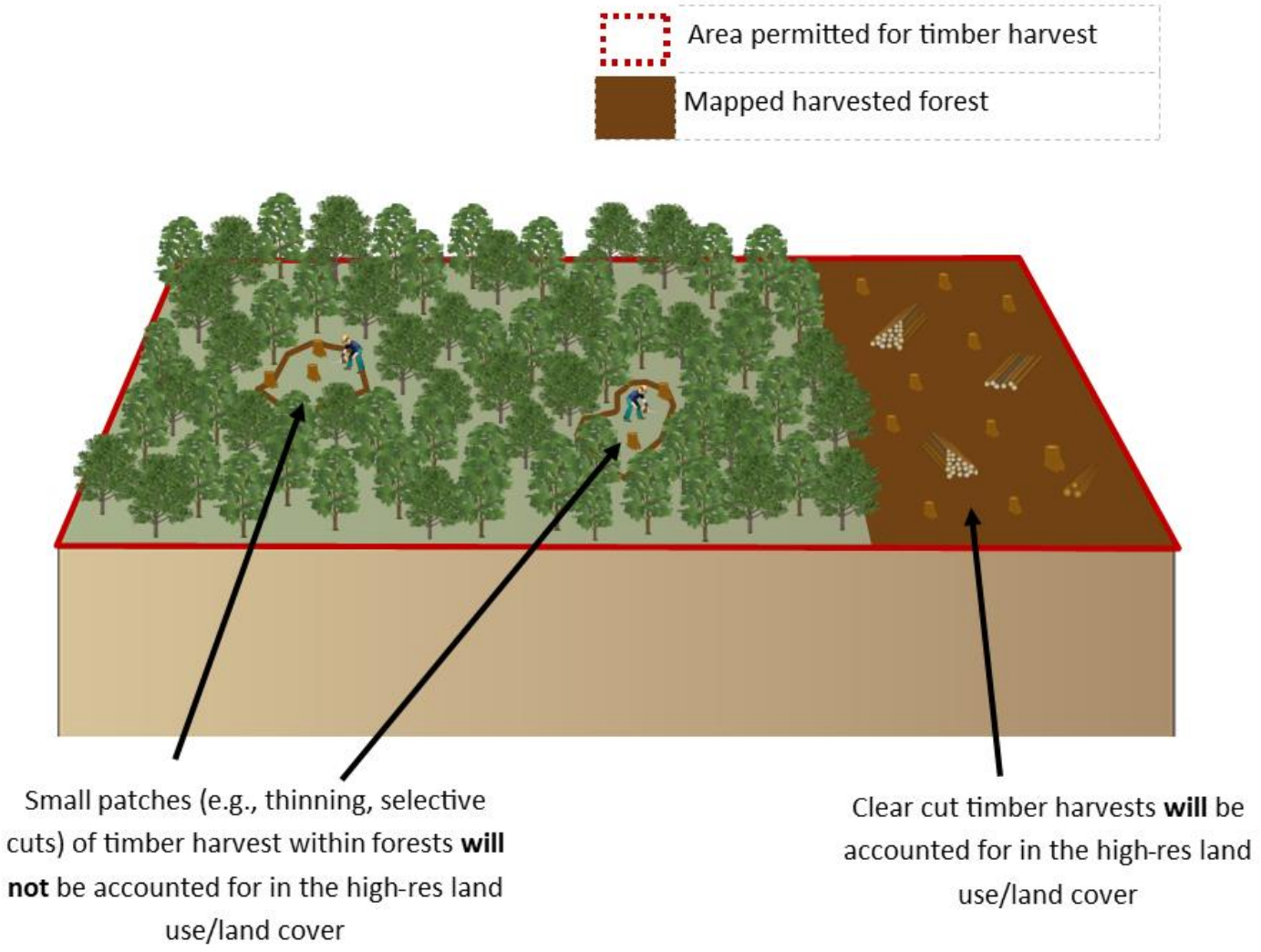
- For states that don't report their harvested forest acres as part of their annual Progress reporting, the default rate for harvested forest should be changed from 1.5% of true forest to 1.1% of true forest.
- 1.1% was derived using FIA data to estimate the % of true forest that is harvested annually watershed-wide

	total % cut/cycle length	annual % cut estimates (using remeasured plots)
CBW	1.06%	1.11%
DE	0.76%	0.89%
MD	0.30%	0.38%
NY	1.41%	1.90%
PA	1.00%	1.20%
VA	0.89%	1.09%
WV	0.55%	0.65%

Reconciling reported and mapped harvest data

Phase 6 Process

- Some states reports harvested forest acreage to CBP at county scale
  - Reported harvested forest acres are proportionately allocated to sub-county modeling units (land-river segments, LR Segs) by the CBP based on the relative amount of “true forest” within each unit
- States that don’t report harvested forest acreage have the default rate (currently 1.5%) applied proportionately based on the distribution of true forest across LR Segs
- USGS maps clearcuts every 4-5 years (and interpolates for intervening years)
- Both mapped and reported/default acres are subtracted from “true forest”
  - Clearcuts are getting double-counted! This is a particular issue for states with significant amounts of clearcuts



FIA-derived estimates of more intensive harvests (2018)

	% of harvests in "clearcut"
CBW	20.92%
DE	32.86%
MD	21.44%
NY	0.00%
PA	8.72%
VA	47.31%
WV	0.51%

Graphic credit: Jackie Pickford, USGS

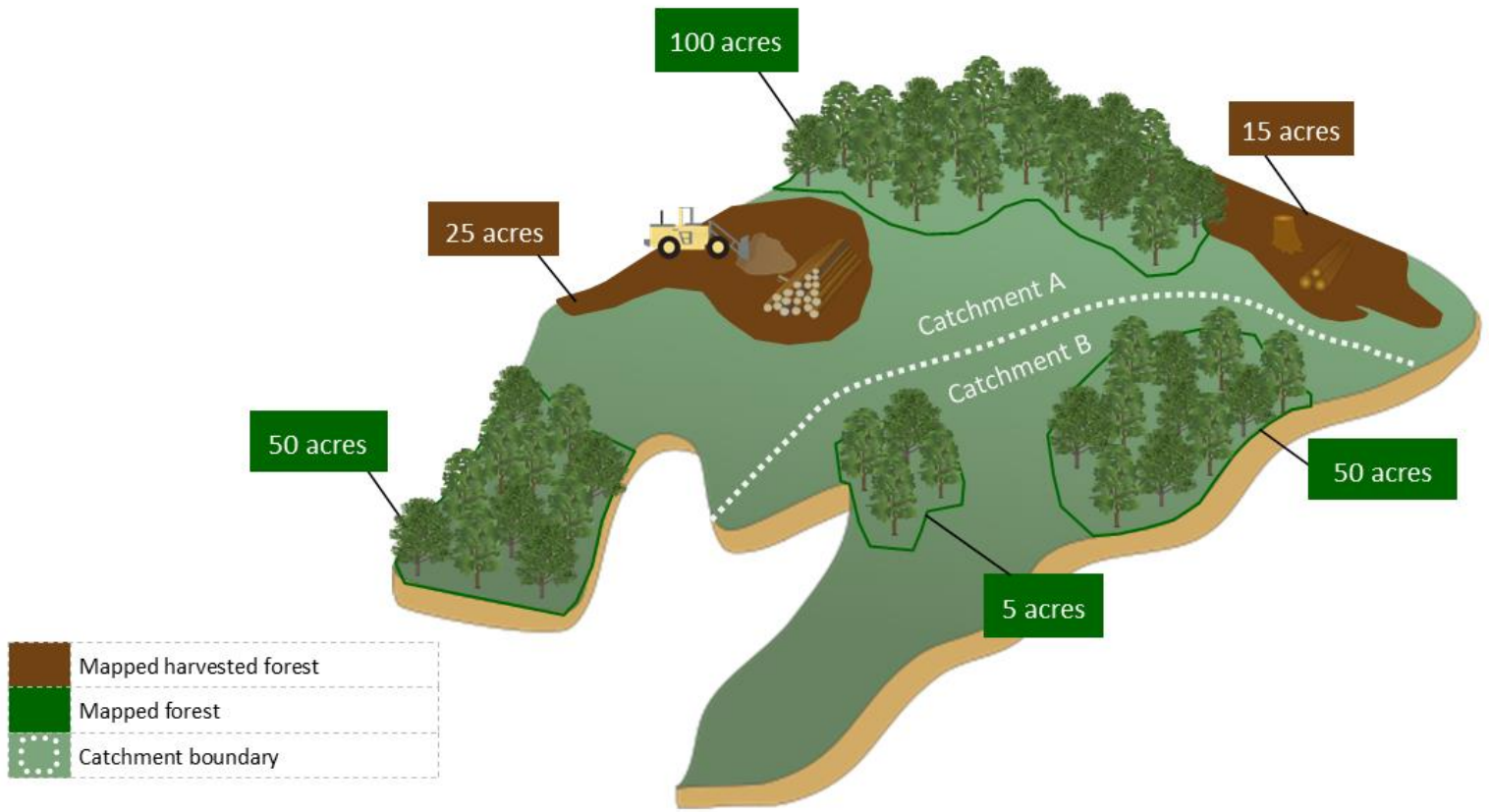
Reconciling reported and mapped harvest data

Phase 7 approach:

- States continue to report harvest data at the county scale
- Reported data are spatially allocated to the harvested forest footprint up to the amount reported
- Any additional reported acres (above mapped acres) are distributed across NHD catchments within each county based on relative amount of “harvestable” forest in each catchment
  - “Harvestable” forest would be defined as forest patches >10 acres
  - “Harvestable” forest footprint would be updated with the LULC data (every 4-5 years)

County X reported 100 acres of harvested forest. The land use/land cover mapped 40 acres of harvested forest.

How do we reconcile the remaining **60 acres** of harvested forest?



Proposed Phase 7 Approach:

Identify large patches of harvestable forest (>10 acres) in which remaining acres of reported harvest data can be allocated.

Graphic credit: Jackie Pickford, USGS

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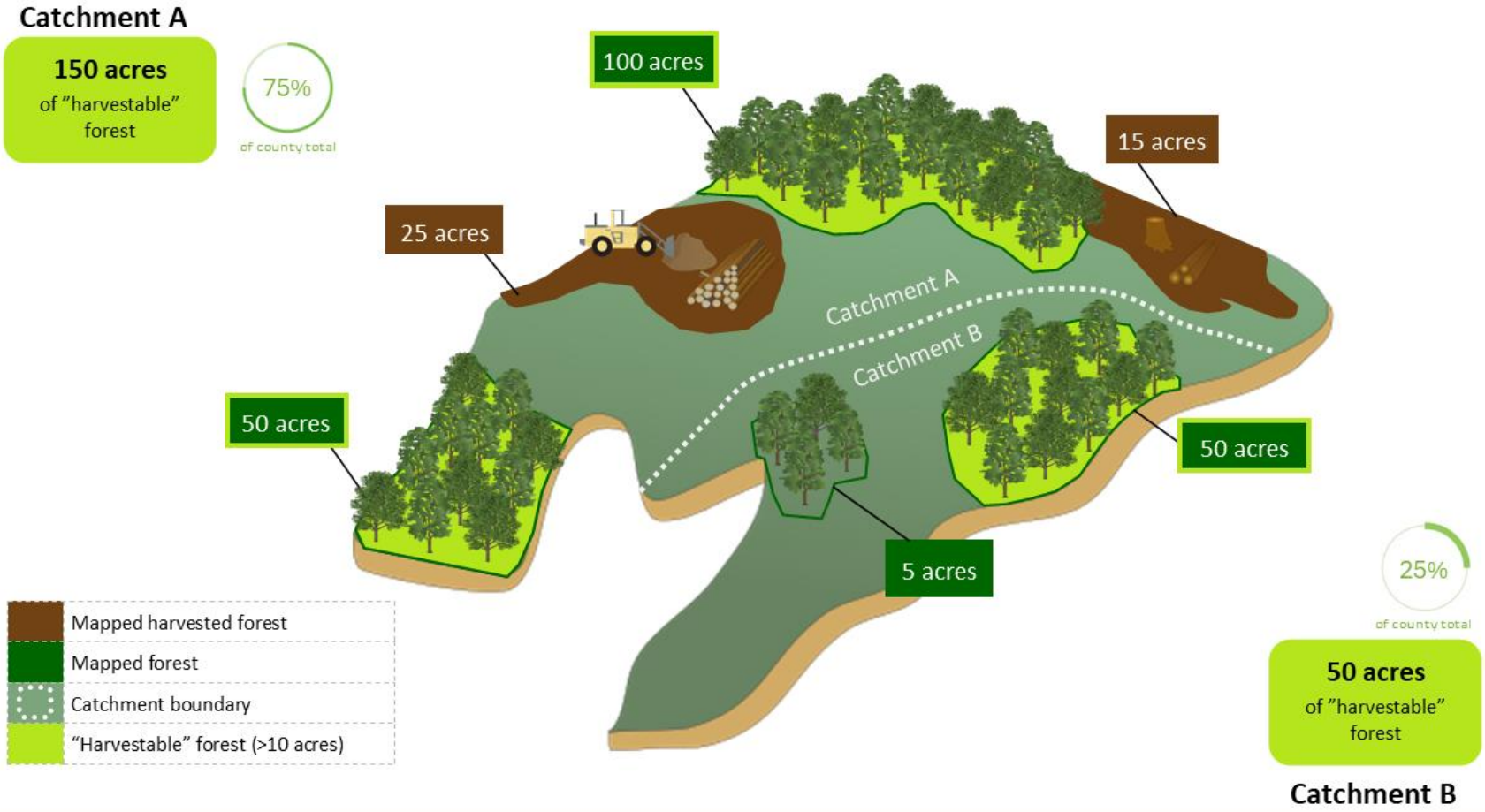

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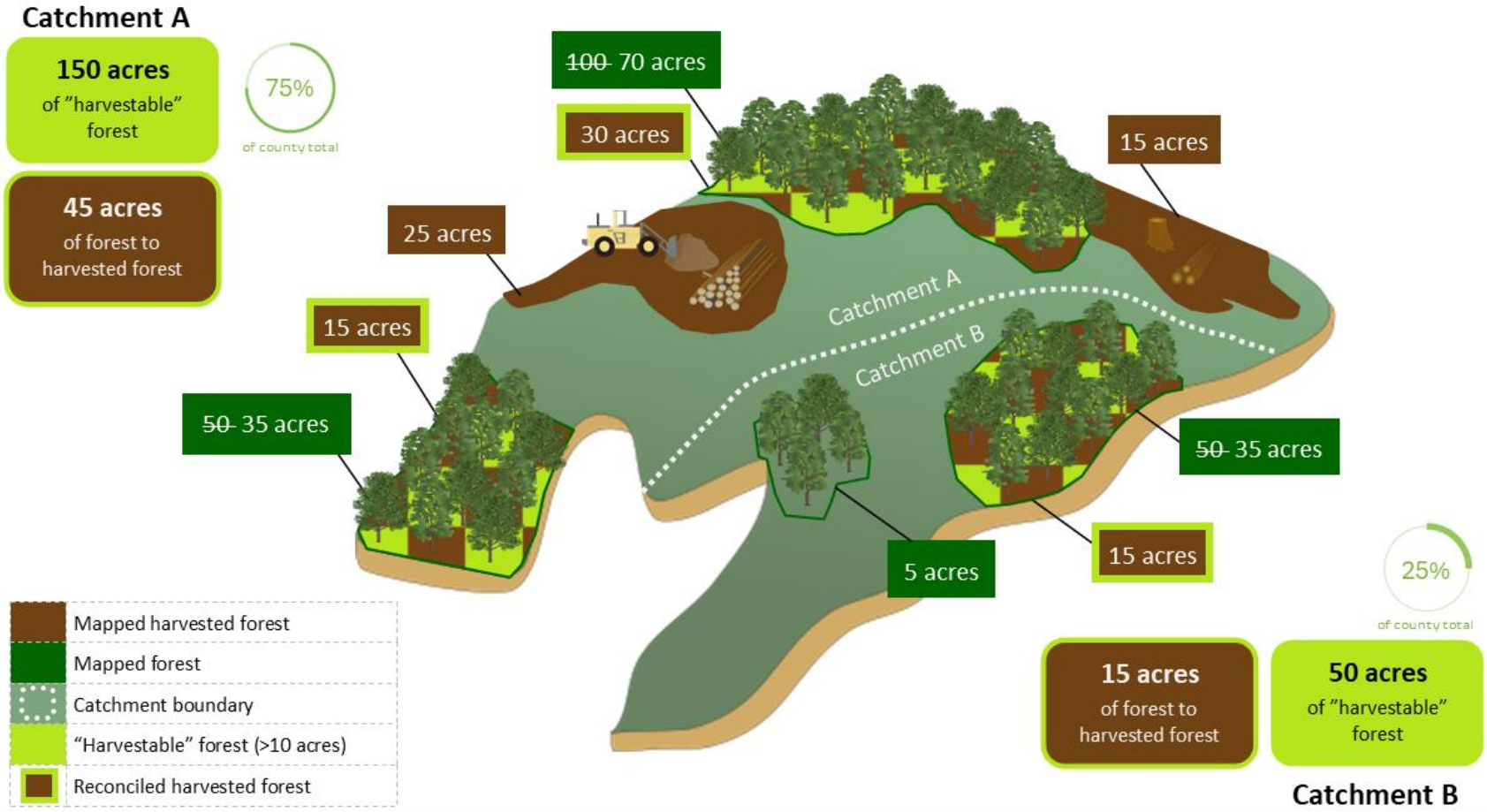

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Forest Harvesting BMP Recommendations

Forest Harvest BMPs

Forest Harvests use a wide variety of practices to minimize water quality impacts including:

- Water bars
- Culverts
- Maintaining forest buffers (also highly effective for N removal)
- Stream crossings where necessary (many harvests aim to avoid crossings)
- Avoiding depositing organic material from harvest in streams

Current Forest Harvest BMP in CAST:

Forest Harvest BMPs decrease total loads by:

- Total Suspended Solids (TSS) – **60%**
- Total Nitrogen (TN) – **50%**
- Total Phosphorus (TP) – **60%**

- Determined via 2009 report by Pamela Edwards & Karl Williard
- 1-year credit duration
- More information in the BMP Guide, Page 162

	Original recommended loading rate ratio	Current forest harvesting BMP efficiency	Loading rate ratio after BMP application	% of additional loads over True Forest removed by BMPs
TN	7.03	50%	3.52	58%
TP	3.12	60%	1.25	88%
TSS	3.05	60%	1.22	89%

Research Methodology

- Published 2009 – Present
- Within the CBW or neighboring states
- Eastern mixed deciduous and pine forests
- Interview with experts
- Initial review looked at TN, TP and TSS. Re-focused on TN given already high efficiencies for TP and TSS
- Focused on research evaluating impacts on TN loads (not concentrations)
    - Loads measure the total amount of a pollutant entering a waterway over a period of time (accounting for changes in streamflow)

Revised efficiency rate calculations

	Loading Rate Ratio
True Forest	1
Harvested Forest with BMPs (based on Boggs et al. 2015)	2.98
Previous harvested forest ratio (without BMPs)	7.03
Efficiency rate required to achieve loading rate ratio from Boggs et al. 2015	57.6%

*Literature reviewed by Edwards and Williard found a 60-80% efficiency for TN loads (Wynn et al. 2000)

Forest Harvesting BMP Recommendations

1. Recommend changing the efficiency rates of forest harvest BMPs to:
   - **TN from 50% to 60%**
   - **Maintain efficiencies for TP and TSS**
2. Recommend changing the **credit duration for forest harvest BMPs to three years.**

Questions/Concerns?

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