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BREEDING DUCK HABITAT ASSESSMENT FOR NORTHERN OHIO

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INTRODUCTION AND CONTEXT

This assessment, completed for the Ohio Waterfowl Production Area Study Team (U.S. Fish and Wildlife Service and Ohio Dept. of Natural Resources), was developed to inform decisions regarding waterfowl breeding habitat establishment in northern Ohio. Focus counties included Williams, Defiance, Fulton, Lucas, Ottawa, Sandusky, Seneca, Erie, Huron, Geauga, Ashtabula, and Trumbull. The primary goal for designated waterfowl production areas (WPAs) is to provide duck habitat with relatively high survival and recruitment during the breeding period. However, these wetland / upland plant communities (habitat complexes) actually offer myriad benefits to wildlife and to people, and integrating biological and social objectives into habitat conservation decisions is promoted in the North American Waterfowl Management Plan (NAWMP 2012 and 2018).

Information and process in this assessment are founded on the Upper Mississippi / Great Lakes Joint Venture (JV) Waterfowl Habitat Conservation Strategy (Soulliere et al. 2017), which is directly linked to the NAWMP. Should the Ohio Study Team require additional information and evaluation to generate an Environmental Assessment (EA) pursuant to establishing WPAs in Ohio, JV staff can direct the team to additional resources and can provide further consultation regarding this report.

Products provided

- 1. Descriptions of high-quality reproduction habitats for ducks commonly breeding in the JV region, including Ohio. These species are mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), and blue-winged teal (*Spatula discors*).
- 2. Maps depicting relative density and distribution of potential breeding habitats for these focal species in northwest (NW) and northeast (NE) Ohio, BCRs 23 and 13 respectively.
- 3. Estimates of breeding duck densities likely to occur at restored wetlands with high quality habitats.
- 4. Maps depicting landscape characteristics that increase the likelihood for viable duck breeding habitat establishment.
 - a. Map of hydric soils in areas currently in row crop agriculture (restorable wetlands).
 - b. Map of current conservation estate (public lands and perpetual conservation easements), where habitat complexes may be expanded.

5. Maps potentially useful for integrating biological and social objectives, including locations where waterfowl habitat restorations can help address nutrient runoff as well as provide outdoor recreational opportunities closer to people.

Potential products requiring additional analysis

- 1. Assessment of agricultural yields (highest value vs. lower value agricultural lands).
- 2. Assessment of nutrient and sediment inputs to tributaries within focus area.
- 3. Assessment of crop insurance claims to identify regularity of flooding in focus area.
- 4. Assessment of recent cover type change (conversion from or to potential waterfowl breeding habitats).
- 5. Map(s) to target local-scale habitat-conservation actions for breeding waterfowl based on integrated priorities weighted by stakeholders.

Most species of breeding waterfowl use areas with multiple wetland types (e.g., combinations of emergent, aquatic bed, unconsolidated / open water) and upland nesting cover. The juxtaposition of suitable breeding wetlands and associated upland cover often determine habitat quality (i.e., high survival / recruitment). Descriptions of high quality habitats for mallard, wood duck, and blue-winged teal are provided and used to predict response (expected pair densities per hectare [ha] / acre) by these species to habitat restorations within the focus areas (9 NW and 3 NE counties). The National Wetland Inventory (NWI; USFWS 2016) supplemented with National Land Cover Data (NLCD; Homer et al. 2015) were used to relate species-habitat associations. Locations with poorly drained to somewhat poorly drained (hydric) soils and current land use in cultivated cropland were identified using NLCD and U.S. Department of Agriculture soils data (www.soils.usda.gov/survey).



Riverine and Palustrine systems (from Federal Geographic Data Committee 2013).

Combinations of wetland types and key upland features provide the habitat complexes essential for breeding ducks. For example, blue-winged teal are associated with the NWI

Emergent wetland class, but breeding habitat for this species must also include NWI class *Aquatic Bed*, and the landscape must be largely open (limited forest) with extensive areas of upland grassland / herbaceous nesting cover. Breeding mallards also use wetland complexes with NWI classes *Aquatic Bed* and *Emergent*. They can successfully reproduce in semi-forested landscapes, but both mallards and blue-winged teal produce best in areas of limited forest cover. Wood ducks use a variety of *Forested*, *Emergent*, and or *Scrub-shrub* NWI-class wetlands when adequate food and nest sites are available, typically in more forested settings. For example, the wood duck often uses *Emergent* and *Aquatic Bed* wetlands near or within mature deciduous forest, which can be wetland or upland forest as long as it contains nest cavities.

Species Habitat Requirements and Current Regional Distribution

Maps with relative distribution and abundance of duck species commonly breeding in the JV region were developed using spatial and population abundance data from the standardized Waterfowl Breeding Population and Habitat Survey (WBPHS, 2005–2014) conducted in Michigan, Wisconsin, and Minnesota (BCRs 12 and 23). Models built with these data helped predict the distribution of potential breeding duck habitat in un-surveyed portions of the JV region, including northern Ohio. Most breeding duck habitat in the JV region was found in BCRs

23 and 12 (MI, WI, and MN), but smaller potential habitat areas also existed in Ohio.

For this assessment, we reanalyzed these spatial data and scaled results for the 9-county (NW) and 3-county (NE) target areas of northern Ohio. This work resulted in higher resolution maps of potential existing wetlands and waterfowl habitat. Recognizing locations having current potential breeding habitat (based on latest available spatial data) can help planners build



(expand) larger and more diverse habitat complexes resulting in higher likelihood of waterfowl use and reproductive success. Descriptions of high quality breeding habitat in the JV region were based on the literature combined with expert opinion (see 2017 JV Waterfowl Strategy). Although we describe "optimal" habitat for each waterfowl species of interest, the mallard and wood duck are somewhat flexible, and they may use sites with diverse characteristics as long as adequate food for reproduction and cover from predators are available.

Species-habitat associations for wetland-bird guilds occurring across the Upper Mississippi / Great Lakes Joint Venture (JV) region during the breeding period. *Primary* (NWI wetland classes) and *Secondary* (NWI classes and or NLCD upland cover classes) column headings reflect spatial data used in habitat modeling for each guild. Individual species regularly use multiple wetland types and bird groupings are for general planning purposes; bold names are focal species for Ohio Waterfowl Production Area assessment. See 2017 JV Waterfowl Habitat Conservation Strategy for additional detail.

Primary \rightarrow	Eme	ergent	Forested	Aquatic Bed		
Secondary \rightarrow	Aqautic Bed or Unconsolidated	Aquatic Bed and Grassland/herbaceous	Aqauitc Bed/Emergent or Scrub- Shrub and Deciduous Forest ^b	Emergent and Unconsolidated		
Waterfowl						
	Mallard	Blue-winged Teal	Wood Duck	Ring-necked Duck		
	Gadwall	Northern Shoveler	Common Goldeneye	American Black Duck		
	Green-winged Teal	Canada Goose	Hooded Merganser	Redhead		
				Trumpeter Swan		
Waterbirds						
	American Bittern Least Bittern Common Gallinule American Coot	King Rail Sora Yellow Rail Black Rail Virginia Rail Sandhill Crane Whooping Crane	Black-crowned Night-Heron Great Blue Heron Great Egret Snowy Egret Little Blue Heron Cattle Egret Green Heron Yellow-crowned Night-Heron	Black Tern Pied-billed Grebe Red-necked Grebe Forster's Tern		

Mallard. — Breeding habitat for this species in the JV region is located primarily in BCR 23. High quality habitat includes a complex of seasonal and semi-permanent open-water and emergent herbaceous wetlands in generally open landscapes (limited forest) with adjacent upland grassland / herbaceous plant cover. The optimal grassland-wetland complex should include >1 ha (2.5 acres) of herbaceous upland cover for each 1 ha of emergent wetland with aquatic bed / open water, thus ≥2 ha of habitat / pair. Multiple breeding pairs may use large wetlands, but these areas typically include nearby pairing ponds or pond-like openings in larger wetlands resulting in adequate isolation during pair bonding. A single wetland may serve as habitat for multiple broods, however mallards are territorial, and some distance and visual isolation is necessary during the pair bonding / early-nesting period. The most critical habitat element for mallards appears to be quality brood wetlands, thus invertebrate rich emergent / open water wetland mosaics should be the highest restoration priority.

Focus counties currently have at least some potential mallard habitat based on recent landcover data; depicted below are locations with potential wetlands and suitable uplands. Assuming local mallard populations are limited by breeding habitat, new production areas with wetland / grassland mosaics >2 ha (5 acres) in size, including ≥1 ha (2 acres) of high quality brood wetland, should be used by breeding mallards. Monitoring at restored wetlands in a Michigan clay lakeplain (Soulliere and Monfils 1996) found a density of 2.5 duck broods / wetland ha, including 20 total broods (10 mallard) using 22 basins on a 120 ha habitat complex. Given time, a similar habitat complex in northern Ohio may also accommodate 10-20 mallard pairs. Assuming hen success of 50% (i.e., accounting for some hen/nest/brood mortality and re-nesting by surviving hens), 20 breeding pairs in the spring may result in >70 mallards in the fall flight (e.g., 20 hens x 0.5 = 10 broods of 4 surviving ducklings + 20 surviving drakes + 15 surviving hens = 75). An emergent wetland restoration objective of 7,750 ha was established for NW Ohio (BCR 23) to help meet JV regional mallard population-abundance goals, and a restoration objective of 5,200 ha of high quality emergent wetland was established for the NE (BCR 13) (Soulliere et al. 2017:75-78). The Ohio mallard habitat retention objective for high quality emergent wetland is 24,400 ha and 16,400 ha for NW and NE Ohio, respectively.



Wood Duck. — This species breeds largely in BCRs 23, 12, and 13 (NE Ohio) within the JV region. Optimal breeding habitat includes >0.5 ha (1 acre) emergent and or woody wetlands (deciduous scrub-shrub and forested wetlands) with open-water areas (aquatic bed and unconsolidated bottom) that remain inundated through the brood rearing period and are located <2 km (1.3 mile) from mature deciduous forest providing nest cavities. Most wetlands in the JV region are <1 km from mature forest, and wood duck broods are readily moved long distances overland to food-rich wetlands adequate for brood rearing. Thus, the nest-cover component for wood duck reproduction is assumed adequate and the habitat deficit is for wetland area only. Wood duck pairs are not territorial, likely due to the dispersed nature of tree cavities, and multiple breeders and broods may use the same wetland when food and cover are adequate.

Several areas within the focus counties currently have potential wood duck habitat, based on recent spatial data. Assuming local wood duck populations are limited by breeding habitat, each new breeding area with woody and or herbaceous wetlands >0.5 ha (1 acre) in size, and near mature deciduous forest, should accommodate at least one pair of wood ducks. Thus, a 100 ha habitat complex with 20 wetland basins (\geq 0.5 ha) having suitable brood habitat may over time be occupied by as many as 20 wood duck pairs. Assuming hen success of 70% (i.e., accounting for some hen/nest/brood mortality and re-nesting by surviving hens), 20 breeding

pairs in the spring may result in >90 flighted wood ducks in the fall (e.g., 20 hens x 0.7 = 14 broods of 4 surviving ducklings + 20 surviving drakes + 18 surviving hens = 94). To help meet JV regional wood duck population-abundance goals, a habitat restoration objective of 1,300 ha was established for NW Ohio (BCR 23) and an objective of 400 ha was established for NE Ohio (BCR 13) (Soulliere et al. 2017:75-78). The Ohio habitat retention objective for high quality wood duck habitat is 4,000 ha and 5,800 ha for NW and NE Ohio, respectively.



Blue-winged Teal. — Optimal habitat for this species includes a mix of seasonal flooded and shallow semi-permanent open-water and herbaceous wetlands in open (un-forested) landscapes with extensive grassland / herbaceous uplands. The production area should be >1 ha of herbaceous upland nesting cover for each 0.5 ha of emergent wetland and aquatic bed / open water, thus ≥1.5 ha habitat / pair. Breeding blue-winged teal suffer relatively high mortality near forest cover (aerial predators), thus they are more common in the western portion of the JV region (western BCRs 12 and 23) and relatively uncommon in Ohio.

This species readily pioneers into new areas when high quality breeding habitat becomes available, and use of restored wetlands is more likely in the relatively open landscapes of NW Ohio. Assuming local blue-winged teal populations are limited by breeding habitat, each production area with wetland / grassland mosaics ≥1.5 ha in size, including 1 ha of high quality nest cover and ≥0.5 ha of high quality wetland, all >0.3 km from forest, could accommodate a pair of blue-winged teal. Like the mallard, blue-winged teal are territorial. Each pair requires a unique wetland area (or visual isolation at larger wetlands) adequate for pair bonding and the pre-nesting period. Ohio is located at the southern and eastern edge of this species breeding range, however, and due to extensive agriculture and forest cover, breeding blue-winged teal likely remain rare in this portion for of the JV region. Thus, even with the addition of new waterfowl production areas in Ohio, breeding populations of this species are not expected to increase significantly.



All Breeding Ducks. — Multiple duck species can use the same individual wetlands. For example, a 2-ha wetland with adequate food, water, and cover, plus appropriate upland vegetation for successful nesting, can potentially accommodate one pair (and ≥ 1 brood) of all three focal species. Surrounding uplands with herbaceous grassland nest cover will increase the probability of wetland use and subsequent reproduction by mallards, and perhaps an occasional blue-winged teal pair. Mature forest capable of providing nest sites for wood ducks is generally common <2 km from brood wetlands or waterways leading to wetlands, and forest cover should be a low restoration priority compared to high-quality wetlands and grasslands.

Potential breeding habitats (i.e., model predicted areas currently with habitat characteristics) across northern Ohio for all three duck species were combined and weighted by species composition in the JV region (mallard 45%, wood duck 20%, and blue-winged teal 14% / 79%) to depict locations relatively more important for ducks. Expanding existing breeding habitat areas via land acquisition, other forms of protection, and restoration of wetland / grassland is an effective means to expand and retain local duck populations. Potential wetland area for breeding mallards was 3,340 ha in the NW Ohio counties and 1,784 ha in the NE counties, based on models built with recent NWI and NLCD spatial data (Appendix A). Potential breeding habitat area for all three focal species combined was 25,730 ha in the NW and 40,205 ha in the NE counties (Appendix A). This area calculation accounts for overlap of predicted habitats for all focal species (i.e., habitat area for "all ducks" is less than total for each species combined).



TARGETING HABITAT RESTORATION

Determining locations where wetlands once existed is a valuable component of the siteprioritization process for waterfowl habitat restoration. Areas that have experienced wetland loss can be determined with available tools, including historic aerial photography and current



Locations exhibiting poorly drained to somewhat poorly drained soils currently in cultivated cropland (green) based on soils and land cover assessment. Local-scale soils data is available from U.S. Department of Agriculture (www.soils.usda.gov/survey).

spatial data identifying hydric (poorly drained) soils. The area of poorly and somewhat poorly drained soils currently in cultivated cropland is substantial in northern Ohio, especially in the NW counties (Appendix A). Reverting poorly drained cropland to wetland can be an effective means to increase breeding waterfowl habitat while addressing high flood risk on agricultural lands. Moreover, restoration of native plant communities surrounding wetland basins and river corridors is an appropriate action for repairing degraded aquatic systems and maintaining wetland health. In some locations, upland cover can be the missing habitat element for breeding ducks (e.g., nest cover for mallard and blue-winged teal). Because areas have been subject to agricultural operations for many decades, wetland restorations may require land-surface contouring to assure deeper areas remain inundated through the brood-rearing period.

Conservation lands are areas held in public ownership or under long-term conservation easement, and the bird habitat they encompass is generally considered protected from development. Understanding the distribution of conserved lands is another consideration for establishing effective waterfowl production habitat. Primary sources of spatial data available to help measure distribution and abundance of conservation lands in the JV region included the Protected Areas Database of the United States (PAD-US) and the National Conservation Easement Database (NCED). Staff at the JV Science Office pooled and cleaned these data for compilation errors, then developed a map of current conservation lands in northern Ohio. In addition to *Federal* and *State* lands, an ownership category labeled *Other* was included. This category depicts private land with perpetual/long-term conservation easements (e.g., Wetlands Reserve Program [renamed Wetland Reserve Easement – WRE]), conservancy land, and county, township, and other public/private holdings. There are an estimated 36,860 ha of Federal (3,375), State (10,863), and Other (22,622) conservation lands in NW Ohio and 44,411 ha of Federal (2,631), State (16,616), and Other (25,164) conservation lands in the NE (Appendix A).



Social Considerations

A current challenge for the conservation community is integrating objectives for waterfowl populations (biological) and people (social), which was articulated in the latest versions of the NAWMP (2012, 2018). The Upper Mississippi / Great Lakes JV has been a leader in addressing this challenge when planning conservation activity at the regional scale. In the 2017 JV Waterfowl Strategy, waterfowl habitat – its quantity, quality, and location – was used as the primary means to achieve the NAWMP goals, both biological ("abundant and resilient populations") and social ("growing numbers of waterfowl hunters, other conservationists, and citizens who enjoy and support conservation").



impaired watersheds across the JV region, where restoration of wetland and upland plant communities could reduce sediment and nutrient inputs that have impaired these aquatic systems. In addition, areas of



the region near human population centers were documented, where conservation of waterfowl habitat should have the highest likelihood of providing recreational opportunities to hunters, birders, and others seeking access to wild landscapes generally <50 km from home. This type of information is increasingly important to JV partners seeking to make bird habitat conservation relevant to society (i.e., future financial and political supporters of bird habitat conservation).

The image below, generated from the 2017 JV Waterfowl Strategy, reflects a landscape prioritization for targeting waterfowl habitat conservation that can achieve integrated biological and social objectives relevant to the JV. Objectives (and their weights in the mixed model) included increasing breeding (30%) and non-breeding (30%) waterfowl habitat, waterfowl hunting (10%), and other outdoor recreation opportunity (10%), while also addressing impairments to the Mississippi River / Gulf Hypoxia (10%) and Great Lakes coastal wetlands (10%) (see 2017 JV Waterfowl Strategy for more details).



DISCUSSION AND CONCLUSIONS

Several sources of scientific information were provided to inform decisions for the establishment of waterfowl breeding habitat in northern Ohio. More detailed information, including some county-level analyses, were not included is this document but are available upon request. In addition, staff at the JV Science Office may be able to assist the Ohio WPA Study Team with supplementary analysis, especially regarding integration of social objectives.

One important caution when using species-habitat maps provided in this document is that the data we used represent a point in time (when digital-image data were collected), and these results have not been ground-checked. Therefore, maps were labeled "potential habitat" because they reflect only expected presence of wetlands based on available NWI imagery. An extended period of above average precipitation before the last NWI update, recent drainage and cropping or drought, and even new wetland restorations may all result in map inaccuracies. Moreover, wetland inundation changes with hydrologic conditions, especially long-term cycles in precipitation. Waterfowl habitat restoration and retention seeks to maintain existing habitat features and sustainable ecosystems, but also recognizes that healthy plant and wildlife communities are dynamic. Establishment of larger and diverse wetland / upland habitat complexes helps ensure viable production habitat with varied environmental conditions.

Understanding the distribution of existing potential waterfowl habitat and protected habitats (Conservation Estate) can inform management decisions regarding expanding wetland / upland complexes that may result in greater population response. Likewise, recognizing where habitat concentrations exist can inform decisions about opportunity costs, possibly favoring an area in great need of habitat over a well-established conservation site. Evaluating the distribution of

waterfowl habitat delivery may be especially important when integrating social values such as sediment and nutrient retention and hunting / birding opportunity close to people.

Much of the pre-European settlement wetland area occurring in northern Ohio was drained and converted to cropland or development. Drained areas likely provided productive breeding waterfowl habitat prior to conversion, given the historic records describing interspersion of wetlands, grasslands, and forest in this part of the state. Where land conversion to agriculture has been less intense (e.g., far NE and NW Ohio), wetlands are capable of providing suitable breeding habitat for ducks when hydrologic condition are favorable. However, reliable records quantifying breeding waterfowl productivity do not exist, confounding predictions of possible waterfowl breeding capacity. Monitoring at restored wetlands in a Michigan clay lakeplain, a landscape with physical characteristics similar to NW Ohio, found a density of 2.5 duck broods / wetland ha and 20 total broods (10 mallard) on a 120 ha waterfowl habitat complex (Soulliere and Monfils 1996). Estimates of predicted waterfowl response similar to these values were used in this assessment, although the Michigan site was a landscape dominated by herbaceous natural cover and hey fields rather than row-crop agriculture.

There is extensive opportunity to restore wetlands in the focus counties of this assessment, particularly on the farmed hydric soils of NW Ohio. Hydric soils can be restored to wetland once the system of drainage is interrupted and the land is returned to more natural hydrologic conditions. If designed with essential duck habitat characteristics (including upland nesting cover), these restored wetlands should provide suitable breeding habitat. Given the lack of breeding population survey data for Ohio, and recent unexplained declines in Great Lakes mallard populations, we could not confidently predict duck breeding densities at restored habitats. However, we provided typical breeding densities for high-quality wetland / upland complexes in BCR 23. Expansion of high-quality duck production habitat can certainly increase northern Ohio's capacity to support breeding waterfowl populations, particularly if the scale of future restoration projects reaches hundreds or thousands of acres. While this increased production may seem minor at the continental scale, increases in local duck population abundance can be important in achieving JV objectives for this portion of the Great Lakes region. Moreover, wetlands used by waterfowl during the breeding period also provide value to non-breeding ducks, which typically occur at much higher densities during fall and spring.

Regarding the focal species selected for this analysis, our assessment suggests limited potential to expand high-quality breeding habitat for blue-winged teal. Large wetland complexes along Lake Erie and Sandusky Bay currently have locations more suitable for this species, with extensive herbaceous wetlands and relatively low forest cover. Ensuring ample upland nest cover near these herbaceous wetlands would be an appropriate action for blue-winged teal. For wood ducks, the three identified counties in NE Ohio and the wooded riparian corridors of NW Ohio appear to hold the greatest potential for breeding habitat, in addition to some areas along the coast where forest exists in close proximity to potential brood wetlands. Habitat restoration opportunities for this species are widespread, especially at drained wetlands along river and stream corridors. Potential mallard production appears greatest in far NW Ohio and near wetland complexes along Lake Erie and Sandusky Bay.

blue-winged teal are territorial, larger restorations will not necessarily result in proportionate increases in breeding pairs. Larger emergent marshes may provide quality habitat for significant numbers of migrating ducks, but more isolated pair bonding and brood-rearing basins are needed in the spring to maximize local production.

Finally, in order to retain a strong linkage to the 2017 JV Waterfowl Strategy and to the NAWMP, the Ohio WPA Study Team can consider the role of waterfowl habitats to provide social benefits. Conservation of breeding duck populations and their habitats is a primary component of these regional and continental plans, but they also promote improving connections between waterfowl habitat and people. This can be accomplished by recognizing the need and planning for provision of ecological services (e.g., reducing nutrient/sediment runoff), recreational opportunities, and sustainable landscapes with diverse plant communities. Protecting and restoring wetland and upland habitats in northern Ohio, an area with significant water quality challenges, widespread loss of wildlife habitat and green space, and relatively few public recreation areas, would support human dimensions goals of the NAWMP while supporting duck production at a locally important scale.

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Appendix A. Area (ha; 1 ha = 2.5 acres) of current wetlands potentially suitable for breeding mallard, wood duck, and blue-winged teal in counties of northern Ohio based on biological models and recent spatial data; area of poorly and somewhat poorly drained (hydric) soils in row-crop agriculture where wetland restoration success should be high; and distribution and ownership of protected lands in the conservation estate (*Other* = conservation easements, conservancy lands, and county / local municipal).

		Breeding habitat (ha)			_	Ownership (ha)			
			Wood	Blue-winged	All	Hydric			
Region	County	Mallard	duck	teal	ducks	soils (ha)	Federal	State	Other
NW Ohio									
	Defiance	188	1,479	0	1,488	75,172	0	220	967
	Erie	277	1,444	155	1,641	13,371	6	1,985	2,122
	Fulton	185	2,061	33	2,108	65,724	0	890	2,810
	Huron	265	5,219	5	5,222	10,339	0	723	1,397
	Lucas	165	1,730	1,023	2,786	23,197	1,553	1,733	5,687
	Ottawa	945	1,875	1,722	3,770	40,868	1,816	2,264	3,360
	Sandusky	313	2,420	523	2,963	67,495	0	1,498	3,033
	Seneca	55	1,403	8	1,412	88,307	0	404	1,722
	Williams	947	4,272	23	4,340	65,955	0	1,146	1,524
	Sub-total	3,340	21,903	3,492	25,730	450,428	3,375	10,863	22,622
NE Ohio									
	Ashtabula	621	19,762	159	19,807	20,707	0	3,291	4,870
	Geauga	521	8,198	98	8,227	188	0	910	15,572
	Trumbull	642	12,166	189	12,171	944	2,631	12,415	4,722
	Sub-total	1,784	40,126	446	40,205	21,839	2,631	16,616	25,164
	Grand total	5,124	62,029	3,938	65,935	472,267	6,006	27,479	47,786

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